



INSTITUTE FOR DEFENSE ANALYSES

Learning to Adapt to Asymmetric Threats

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PREFACE

This document reports the work performed by the Institute for Defense Analyses for Office of the Under Secretary of Defense, Personnel and Readiness, in partial fulfillment of the task entitled “Joint Asymmetric Warfare: Integrated Training and Exercises Roadmap.”

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CONTENTS

Preface.....	iii
Summary	S-1
I. Study Problem, Scope, and Methodology	1
A. Study Problem.....	1
B. Study Scope	3
C. Study Methodology.....	4
II. A Taxonomy for Understanding Asymmetric Threats.....	5
A. Major Power War and Small War.....	6
B. 3GW and 4GW	9
III. The Changing National Security Environment and Its Implications for Planning, Training, and Adapting.....	10
A. Planning the Higher Levels of War	12
B. Training to Execute Plans	13
C. Adapting over the Long Term.....	14
D. Shifts to Adaptive Training.....	15
IV. Defining the Problem	19
A. Responding to Asymmetric Threats - Learning to Adapt.....	19
B. DOD Positions on Adaptability	22
V. Learning Adaptability.....	34
VI. The Components of Adaptability	39
A. Learning To Be Adaptable.....	41
B. Learning Cognitive Skills	43
C. Learning Relational Skills	49
VII. Modifying the DOD Learning System to Enhance Adaptability	54
A. Adaptability Learning Goals.....	55
B. Commander Leader Teams	56
C. Proposed Changes to Enhance the DOD Learning System	58
D. Potential Training Initiatives	66
VIII. Additional Learning Initiatives	67
A. Training CLTs.....	67
B. Learning in Units	70

IX. Conclusion.....	71
Bibliography	73

APPENDIXES

A. S.E.N.S.E. and Adaptive Leader Training	A-1
B. The Battle Command Knowledge System	B-1
C. The Role of Red Teaming in Training Adaptable Leaders, CLT, and Units	C-1
D. JMW Experiment	D-1
E. Glossary	E-1

FIGURES

1. The Problem of Learning to Deal with Asymmetric Threats	19
2. The Components of Adaptability	40
3. Adaptability Learning Initiatives into Existing Programs.....	59

TABLES

1. Our Task	4
2. Key Requirements for Learning Adaptability	35
3. Factors that Enhance Adaptability	39

SUMMARY

This study explores the changes that might be called for in the Department of Defense (DOD) learning environment to meet the challenges facing the United States as it responds to the asymmetric threats of the 21st century. In DOD planning terms, the concept of an asymmetric threat can be included in the concept of irregular war. In addressing this question, the IDA study team concluded that the asymmetric or irregular threats in the 21st century were largely unpredictable. Given the uncertainty of the threat, the key skill that individuals, units, and teams of commanders and leaders need to learn is adaptability—defined as the degree to which adjustments are possible in practices, processes, or structures of systems to projected or actual changes of situation. In this context, the changes of situation are created by an asymmetric threat.

Given this conclusion about the nature of the threats facing the United States, the study team set out to determine the elements of adaptability, to determine the extent to which the DOD learning establishment might already be focusing on adaptability learning, and to identify ways the DOD could facilitate efforts to learn to be adaptable.

We found evidence across the department that DOD excels in training individuals and units in the set of skills essential for defeating traditional, symmetric, 20th century threats. We also found evidence of successful efforts to adapt these training techniques to the current wars in Afghanistan and Iraq. We found less evidence of a systemic effort to prepare individuals, units, and teams of commanders and leaders to defeat non traditional, asymmetric, irregular threats. Accordingly, we concluded that the DOD needs to revise its learning paradigm to enhance the ability to learn to adapt to the new threats facing the United States.

While each of the services has acknowledged adaptability as a key skill, efforts to enhance adaptability learning are in their infancy throughout the Department. The Army and Marine Corps appear to understand the need for adaptability better and have made better progress in developing techniques to enhance adaptability learning. The Navy and Air Force have identified adaptability as important but appear to focus most of their adaptability-related efforts on developing new technologies and organizations rather than on helping individuals, units, and commander/leader teams (CLTs) to learn to be able to

adapt to the uncertainties of irregular war. We concluded that all of the Services need to enhance their learning paradigm to facilitate adaptability learning.

The IDA efforts have focused on adaptability as the critical skill for conducting effective operations in the 21st century environment. In addition, IDA recognized that adaptability can also be seen as a function, first, of the cognitive skills of intuition and of critical and creative thinking, and, second, of the relational skills of individual self-awareness and of team social skills. IDA concluded that the DOD learning environment needs to be enhanced to facilitate the learning of all of these skills in addition to the set of traditional skills the Services normally address. The IDA study has focused on ways that these skills can be learned and on ways this increased learning burden can be integrated into the current learning environment. Figure S-1 represents the IDA view of the adaptability-related skills that need to be learned.

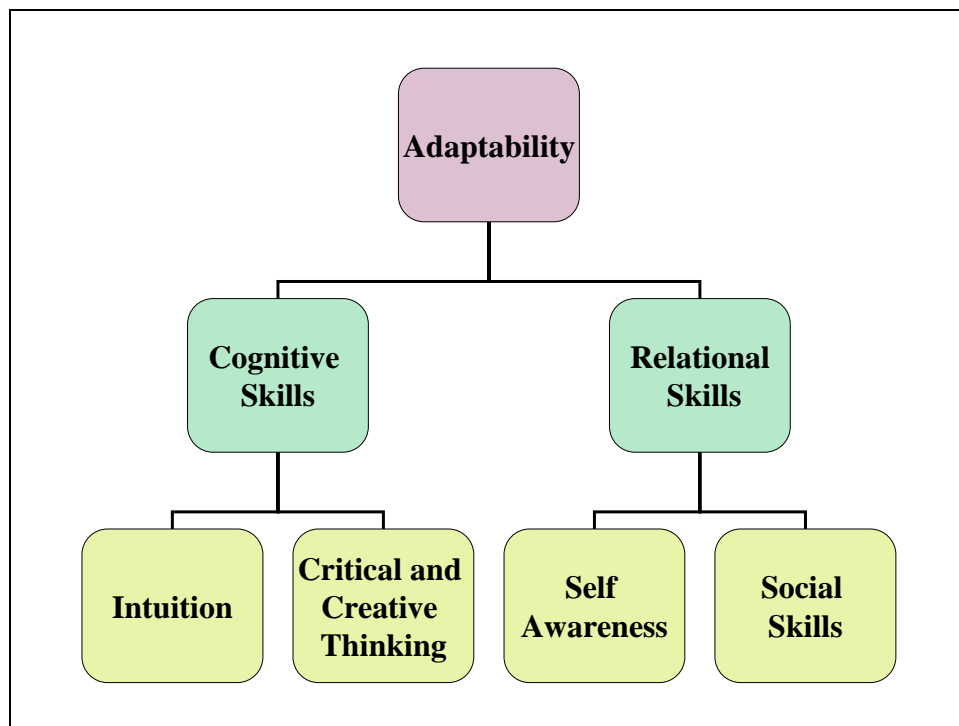


Figure S-1. The Components of Adaptability

We believe that the DOD Training Transformation (T2) program, which includes the Joint National Training Capability (JNTC) and the Joint Knowledge Development and Distribution Capability (JKDDC), can make a major contribution to DOD-wide efforts to learn these five skills. To date in this study we have identified a number of training initiatives that appear to have the potential to enhance adaptability learning throughout the Department of Defense. While many of these initiatives might also be

appropriate for service learning environments, all appear to be appropriate for T2, whose implementation plan calls for T2 to “prepare the force to learn, improvise, and adapt to constantly changing threats.” We based these recommendations on our concept of T2 as a source of learning tools that can be used at the discretion of DOD trainers and educators to meet their needs. In our view, T2 ought to recognize the innovative work that the services and others within and outside the DOD are doing and should collect and provide those innovative training tools to potential users throughout the department. In this context, we see this study as a first step in identifying the innovative training tools under development throughout the department that T2 could provide DOD-wide.

In the conduct of the study to date, we have reached a number of conclusions regarding learning tools that could be incorporated into the DOD learning environment in the context of Training Transformation:

1. Expand the distributed interactive simulation entitled Synthetic Environments for National Security Estimates (S.E.N.S.E.) that was developed for the Supreme Allied Commander Europe into a learning tool for use in educational institutions and for training CLTs. Incorporate S.E.N.S.E. into JNTC.
2. Expand the Army-developed concept of the Battle Command Knowledge System (BCKS) collaborative environment to the entire DOD to facilitate both the sharing of knowledge and development of adaptability-related skills. Expand JKDDC to incorporate this concept.
3. Expand the use of decisionmaking exercises (DMXs) across the tactical, operational, and strategic realms and use them to develop adaptability-related skills. Incorporate DMXs into educational and training environments. Use both JKDDC and JNTC to provide DMXs.
4. Develop (or expand) within JNTC a robust Red Teaming structure with both online and mobile training teams capable of supporting DMXs in the live training environment. The red team support structure should be capable of simultaneously providing adaptable, capabilities-based adversaries to multiple DMXs at the strategic, operational and tactical levels. The JNTC red team should be capable of routinely supporting Service red teaming efforts and of providing red team training to units temporarily role-playing the adversary.
5. Use JKDDC to provide self-development programs that will allow individuals to enhance their cognitive and relational skills.
6. Use JKDDC to provide a DOD-wide tool for conducting 360-degree assessments.

7. Enhance the JNTC concept of large-scale exercises to include more operational and strategic considerations and to facilitate learning adaptability.
8. Conduct an experiment or demonstration program to investigate the potential for adaptability learning efforts to enhance the ability of units to perform their basic functions in the context of the changing environment.

I. STUDY PROBLEM, SCOPE, AND METHODOLOGY

A. Study Problem

This study addresses the question, What changes might be called for in the Department of Defense (DOD) learning environment to meet the challenges facing the United States as it responds to the asymmetric threats of the 21st century? The essence of the learning challenge that DOD must address in today's military environment has been clearly articulated by one of the most respected soldiers and educators the Department of Defense has produced in modern times, Brigadier General (retired) Huba Was de Czege. General Was de Czege distinguished himself as a soldier during a long career as an infantry officer and as an educator as the father of the Army's School of Advanced Military Studies. This initiative set the stage for the development of similar schools in each of the military services. His comments quoted below were addressed to the Commandant of the Army Command and General Staff College (CGSC), but they appear to be applicable across the board to DOD educational institutions whose charter extends beyond a purely technical curriculum.

The Demands of the Future on CGSC and Its Product

There are many good reasons to take a fresh look at the education of officers at Ft. Leavenworth. Among these is the experience of recent and current operations, the most far reaching reorganization of the Army since before WWII, and the ongoing and accelerating revolution in the technologies of war. In addition, the evidence of the Army's systematic studies to explore the future indicate that the current novel and challenging operating environment will continue to evolve rapidly as technologies proliferate and potential adversaries learn from recent operations. While the US Army is currently deeply engaged in operations in Iraq and Afghanistan, it will be difficult to predict where and against whom the US Army will fight next. By far the most important ingredient of America's future Army forces will be the training and education of adaptable leaders with consistently sound military judgment. Warfare remains a contest between groups of determined people in a confusing and deadly struggle. Consistently sound judgment by tactical leaders remains crucial to identify what must be done, provide direction, and maintain continuity of effort in the face of enemy action in rapidly evolving and complex situations under very difficult conditions. This should remain the top institutional priority of the Command and General Staff College.

Tactical leaders must consistently be more able than the enemy to convert the combat potential they have at hand into superior relative combat

power under any circumstances. This depends in part on their ability to observe, orient, decide, direct, monitor execution, assess results and adjust their operations. Much of this demands intellectual preparation, practical experience, and knowledge of capabilities at their disposal. As weapons and equipment become more lethal and more capable, the relative value of each individual leader, soldier, and planner will increase also. It is, after all, their competence that directs the fruits of technology toward mission success. And that also hinges on the personal determination of leaders, their ability to motivate soldiers to assume risk, and to manage the collective reservoir of courage in their organizations. A consistently critical insight of recent battlefield experience, confirmed by Army studies, is the high value of human brains and creativity. Fighting an asymmetric enemy successfully in complex environments is less dependent on reacting to the enemy than it is conceiving viable options that cause the enemy to react. Information technologies are extremely helpful toward being able to seize the initiative, but the creativity of commanders and their staffs is more important.

The less predictable the demands for which they must prepare, the less we can afford to base the training and education of leaders on a rigidly consistent doctrinal template. Instead, future Army doctrine, education, and training must be designed deliberately to accommodate uncertainty, and to foster a culture of institutional initiative and self-reliance that encourages soldiers and leaders to react calmly to the unexpected, avoid predictability, treat rapid changes in mission and environment as routine, and act aggressively within the framework of the force objective if and when forced to rely on their own resources.”

Consistent with the views of General Was de Czege, we quickly discovered that, when talking about preparing to face an asymmetric threat, we could not easily distinguish between training, education, and learning. Of these three as they are traditionally defined, the one that seems most appropriate to our project is *learning*, which we define as *a change in behavior as a result of experience*. Learning clearly includes training and education but, at least in our minds, goes beyond the traditional concepts of training and education. In our view, DOD must provide enhanced opportunities for individuals and units to learn to deal with the asymmetric threats associated with the current national security environment.

We have concluded that the science of learning has evolved to a point where the distinction between training and education is no longer useful. On the traditional battlefield, training prepares a soldier to deal with expected situations. Education prepares a soldier to deal with uncertainty. On the asymmetric battlefield soldiers know that they will have to be capable of performing specific tasks and following their orders

in order to survive. However, they will also be expected to demonstrate resourcefulness, initiative, creativity, and inventiveness demanded by a battlefield on which confronting the unexpected and new is considered to be routine. Training for the asymmetric battlefield must develop these skills as well as those associated with traditional tactical tasks. Likewise, soldiers studying in a classroom will have access to virtual and synthetic environments that immerse them in a simulated battle that closely resembles real war. Thus, the nature of modern war and modern technology is challenging the traditional concepts of training and education and causing them to merge into a new form of learning. We describe the confluence of training and education as learning packaged into two categories: training as *field learning* and education as *institutional learning*.

In addition, learning to adapt to asymmetric threats requires that individuals and units have the ability to develop new knowledge, skills, and abilities that are necessary for success but for which they have neither been trained nor educated. Conventional wisdom suggests that we “train for the known and educate for the uncertain.” This division is no longer adequate. We must train and educate within an uncertain environment to prepare a force to adapt.

B. Study Scope

The Office of the Under Secretary of Defense for Personnel and Readiness (OUSD (P&R)) has asked the Institute for Defense Analyses (IDA) to perform four specific tasks as part of this study (see Table 1). At this point in the project, the IDA team has been working directly on Tasks 1–3, and this paper reports on the results of those efforts. We have been working on Task 4 as well, but our findings are too preliminary to provide a suggested policy and investment roadmap.

Table 1. Our Task

Overall Task	Objective
	Support the OUSD (P&R) in the development of a training and exercise environment that prepares US forces to respond to asymmetric threats.
Subtask 1: Training Needs Assessment	Identify tasks, contexts, or human capabilities that should be included in this area of warfare.
Subtask 2: Joint Asymmetric Training/Exercise Assessment	Assess current training/exercise efforts.
Subtask 3: Joint Asymmetric Training/Exercise Analysis	Compare training for asymmetric warfare with the tasks currently being trained in joint training and exercises. Identify a range of new or modified tasks and training/exercise methods. Provide an assessment of current techniques compared to the potential offered by the new tasks and methods identified above.
Subtask 4: Provide a policy and investment roadmap	

C. Study Methodology

IDA began this project by surveying the efforts of the services and Joint Forces Command to collect lessons learned from the wars in Afghanistan and Iraq. Our review of these efforts and of the resultant training the services and Joint Forces Command were providing led us to focus on the need to learn to be adaptable as the next step in the evolution of the DOD training and education system. Our next step was to determine what the components of adaptability were and what tools might be available to support efforts to learn adaptability. This led us to conduct a survey of service and joint adaptability-related training programs, of corporate training programs, and of the extensive psychological and training/education literature related to adaptability. Army, Navy, and Air Force experts conducted the survey. Psychologists here at IDA provided expert assistance. We also learned a great deal from LTG (Ret.) Frederic “Rick” Brown, who has created the concept of Commander/Leader Teams and is currently the senior mentor of the Army’s Battle Command Knowledge System.

The IDA team’s focus on adaptability arose out of our research into asymmetric war and the latest training research, especially that done by the Army Research Institute for the Behavioral and Social Sciences (ARI). During that process, the IDA team discovered that there was no widely accepted definition of the word *adaptability*.

Accordingly, we decided that we needed to agree on a definition that could support our continued efforts.

Of the many definitions for adaptability, one seems most appropriate to our study: “Adaptability refers to the degree to which adjustments are possible in practices, processes, or structures of systems to projected or actual changes of climate. Adaptation can be spontaneous or planned, and be carried out in response to or in anticipation of changes in conditions.”¹ ARI has a similar and simpler definition of adaptability that it developed as part of the course it developed for the Army Special Warfare School. According to the ARI report, “Adaptability is an effective change in response to an altered situation.”²

Adaptability is not the only term used in the context of preparing for asymmetric war. Another common term is *agility*, which can be defined as “the ability of friendly forces to act faster than the enemy.”³ Indeed, all of the definitions of agility focus on speed and nimbleness. In our judgment, agility is too narrow a concept to encompass all the factors that seem to be important in dealing with asymmetric threats. While speed or nimbleness is clearly an important trait, we concluded that it was a secondary trait when compared with adaptability. In our view, the essence of adaptability is not speed of reaction, but the slower, more deliberate processes associated with problem solving. As we discuss later, speed in problem solving may come after adaptability-related skills are learned, but speed is a secondary—not a primary—characteristic.

Although we have attempted to cover all the services and the joint world equally, we recognize that this study might appear to have an Army bias. We believe that this perception is largely attributable to the Army’s leading role in the development of adaptability-related learning. We continue to search for other insights into ways to learn adaptability, however, and urge any reader to inform us of adaptability-related initiatives that we have missed.

II. A TAXONOMY FOR UNDERSTANDING ASYMMETRIC THREATS

To ascertain how DOD might change its training system to better prepare for a US response to asymmetric threats, the IDA study team first attempted to understand the

¹ <http://www.ccasia.teri.res.in/gloss/glossary.htm>.

² Army Research Institute, 2005.

³ Headquarters, Department of the Army, 1997.

nature of asymmetric threats. This effort led us to compare the Cold War, which we characterized as a symmetric major power war, with the current set of asymmetric threats facing the United States, which we characterized as small wars. Many of the people with whom we were discussing our training research accepted this taxonomy of major power and small wars. Many others thought of this dichotomy in terms of third- and fourth-generation war (3GW and 4GW). Seeking to focus our efforts on the training-related problem rather than the terminology, we have elected to refer to *major power/3GW* and *small/4GW* when we speak of symmetric and asymmetric threats. The balance of this section attempts to define both concepts.

A. Major Power War and Small War

Direct conflict between major powers exhibits far more symmetry than do major power interventions into the affairs of lesser powers. Eras of major power conflict provide a great many knowns and allow for a strong reliance on long-term planning. In the absence of major power conflict, small, unpredictable wars dominate. Eras of small wars, e.g., major power interventions into the affairs of lesser powers, provide numerous unknowns and considerable unpredictability, and they require a reliance on crisis action planning.

The numbers of forces committed, the number of casualties, or the war's duration do not measure the difference between major and small wars. The US Marine Corps' Small Wars Manual of 1940 provides characteristic differences that together serve as definition.

Major wars are conducted between “first rate” powers—peer states. Small wars are the interventions of a major power into the affairs of a lesser power, typically a failed or failing state.

In a major war, diplomatic relations are summarily severed at the beginning of the struggle. [In small wars] diplomacy does not relax its grip on the situation.

In a major war, the mission assigned to the armed forces is usually unequivocal—the defeat and destruction of the hostile forces.” “The motive in small wars is not material destruction. It is usually a project dealing with the social, economic, and political development of the people.” [In small wars] the mission will be to establish and maintain law and order by supporting or replacing civil government.

In major wars, the organized forces of two peer states will seek decisive battle. In small wars, the forces of a major power will often clash with irregular forces, and the conflict will typically degenerate into guerrilla warfare. “Irregular troops may disregard, in part or entirely, International Law and the Rules of Land Warfare in their conduct of hostilities.”

In major warfare, hatred of the enemy is developed among troops to arouse courage. In small wars, tolerance, sympathy, and kindness should be the keynote of our relationship with the mass of the population.

Similarly, John Schmitt articulates another way to think about the differences between major power/3GW and small/4GW. We have included extensive quotations from this work because it is so relevant to our conclusions regarding asymmetric threats. According to Schmitt:⁴

The great Prussian military theorist-philosopher Clausewitz was an avid amateur scientist and relied heavily and explicitly on the physical sciences to provide metaphors for his military concepts. Two of his greatest and most enduring concepts—friction and the center of gravity—come straight out of the science of the day. Of course, science for Clausewitz was Newtonian science. The Newtonian paradigm is the mechanistic paradigm: the world and everything in it as a giant machine. The preferred Newtonian metaphor is the clock: finely tooled gears meshing smoothly and precisely, ticking along predictably, measurably and reliably, keeping perfect time.

The Western approach to war has been as heavily influenced by the Newtonian paradigm as any other field. So what is war according to the Newtonian paradigm like? Importantly, Newtonian war is deterministically predictable: given knowledge of the initial conditions and having identified the universal “laws” of combat, we should be fully able to resolve the problem and predict the results. All Newtonian systems can eventually be distilled to one simple concept: cause and effect. And in fact, just such efforts to quantify results in war have abounded, starting at least with the famous Lanchester equations. In other words, Newtonian war is knowable: all the information which describes any situation is ultimately available, and the implications can be fully worked out. That which we cannot directly observe, we must be able to extrapolate.

Newtonian war is linear: a direct and proportional connection can be established between each cause and effect. (Here “linear” refers to the dynamical properties of a system rather than to linear formations or frontages on a battlefield.) Small causes have minor results; decisive

⁴ Schmitt 1999, Chapter 9.

outcomes require massive inputs. In the Newtonian view, linearity is a good thing because linear systems are tame and controllable; they do not do unexpected things. If you know a little about a linear system you know a lot, because if you know a little you can calculate the rest.

The Newtonian view of war is reductionist: we understand war by successively breaking it down into parts eventually small enough to understand and control with the expectation that this will allow us to understand and control the whole. The so-called “Principles of War,” are a prime example of this approach. Linear processes are amenable to such decomposition; nonlinear processes by definition are not.

The Newtonian/mechanistic view of war tends to see a military operation as a closed system not susceptible to perturbations from its surroundings. This leads toward an inward focus—on the efficient internal functioning of the military machine. If war is deterministic and if the machine is operating at peak efficiency, then victory ought to be guaranteed—without any need to consider external factors. The mechanistic view likewise leads to a focus on optimization—finding the optimal solution to any problem (which is based on the Cartesian assumption that an optimal solution exists). War comes to be seen as a one-sided problem to be solved—like an engineering problem or a mathematics problem—rather than as an interaction between two animate forces. In idealized Newtonian war, the enemy, the least controllable variable, is eliminated from the equation altogether.

The natural result is a highly proceduralized or methodical approach to the conduct of military operations—war as an assembly line. Newtonian command and control tends to be highly doctrinaire—heavy on mechanistic and elaborate procedures. The mechanistic view recognizes that war may appear disorderly and confusing but is convinced that with sufficient command and control we can impose order, precision and certainty. We can eliminate unpleasant surprises and make war go “like clockwork.” Just as the Scientific Revolution sought to tame nature, the Newtonian approach to command and control—especially with the help of the information-technology revolution—seeks to tame the nature of war.

Newtonian command and control thus tends to involve precise, positive control, highly synchronized schemes and detailed, comprehensive plans and orders. Control measures abound, compartmentalizing the various components of the military machine and specifying how those compartments cooperate with one another. Synchronization (the timepiece metaphor applied to military operations) is merely the example nonpareil of Newtonian war: the military as one huge, highly efficient and precise machine—ticking along like a fine Swiss watch.

The object of Newtonian command and control is to gain certainty and impose order—to be “in control.” Near-perfect intelligence becomes the expectation. We pursue 95-percent certainty within a battlecube 200 miles on each side and we actually expect that we can achieve it. We believe we can blow away Clausewitz’ “fog of war,” and if we fail to do so, it is only because our information technology is not quite capable enough yet—but we redouble our acquisition efforts and promise ourselves it will be soon.

Having made the argument about the Newtonian view of war, which is equivalent to our earlier discussion of major power/3GW, Schmitt argues that the wars facing the United States are completely different, i.e., small/4GW, and, accordingly, require a different approach to preparing for them. According to Schmitt:⁵

Complexity encourages us to consider war in different terms which in turn point to a different approach to the command and control of military action. It will be an approach that does not expect or pursue certainty or precise control but is able to function despite uncertainty and disorder. If there is a single unifying thread to this discussion, it is the importance of adaptation, both for success on the battlefield and for institutional survival. In any environment characterized by unpredictability, uncertainty, fluid dynamics and rapid change, the system that can adapt best and most quickly will be the system that prevails. *Complexity suggests that the single most important quality of effective command and control for the coming uncertain future will be adaptability.* (Emphasis added)

B. 3GW and 4GW

This discussion of 3GW and 4GW is based on the book *The Sling and the Stone*, by COL Thomas X Hammes, USMC.⁶ According to COL Hammes, the development of a new generation of war is evolutionary rather than revolutionary with no clear distinction between one and the other. The evolution of war from generation to generation is a function of political, economic, social, technologic, and military developments. The first of four generations of war grew out of the invention of gunpowder and the political, economic, and social developments that grew out of Europe’s emergence from feudalism. The first generation of war peaked with the Napoleonic Wars of the early 19th century. The second generation of war grew out of the technological developments associated with the Industrial Revolution and the state’s ability to levy and collect taxes. Taken

⁵ Schmitt 1999, Chapter 9.

⁶ Hammes 2004.

together, these developments allowed for the creation of mass armies and the dominance of the defense. The second generation of war peaked with the stalemate of World War I. The third generation of war—maneuver war—evolved out of the lessons learned from WWI and first showed itself in the German invasion of Poland in 1939. The third generation peaked during the Cold War.

Perhaps the most important thing to say about the fourth generation of war (4GW) is that it is the only kind of war America has ever lost. According to Hammes, the United States has lost three 4GWs—Vietnam, Lebanon, and Somalia. The French have lost 4GWs in both Vietnam and Algeria, and the USSR lost in Afghanistan. Indeed, 4GWs continue to bleed America in Iraq and Afghanistan and Russia in Chechnya. In essence, 4GW is unconventional or asymmetric war in which the less capable opponent fights across the spectrum of political, economic, social, and military activity and uses an equivalent of a sling and a stone against its Goliath-like opponent. The global war on terrorism (GWOT) is a fourth-generation war. Another way to think about 4GW is to say what it is not. “It is not high-technology, short-duration war where technology is vital and essentially machines fight machines. 4GW is the complex, long-term type of conflict that has grown out of Mao’s People’s War.”⁷

In this paper, in an attempt to include all aspects of asymmetric threats facing the United States for which the department must find a learning solution, including the GWOT, we will refer to future wars rather than small wars or 4GW.

III. THE CHANGING NATIONAL SECURITY ENVIRONMENT AND ITS IMPLICATIONS FOR PLANNING, TRAINING, AND ADAPTING

Adapting to the new threat environment is not a matter of replacing the Soviets with a different enemy that we may come to know as well as our old foe. This will not happen unless and until the next great power threat rises to dominate the geopolitical landscape. Some of the opponents we will face may not exist today as formal organizations. Some unforeseen precipitating event may bring disparate groups together into a new, loose coalition. We can know neither the actors nor the conditions in advance, as we did during the Cold War.

Great power interventions into the affairs of lesser powers are inherently asymmetric. Lesser powers cannot hope to compete against the United States with

⁷ Ibid., p. 5.

strategic nuclear or conventional force. Asymmetric responses are all that is available. As US forces gain the upper hand in an emerging conflict, the asymmetric foe will adapt to find a more suitable method out of design, out of necessity, or out of desperation.

A variety of asymmetric methods may neutralize our dominance in battlefield warfare. Rather than engage American forces in the open field, asymmetric actors will engage US forces in complex terrain—including mountain, jungle, forest, and urban settings—with small bands of dedicated warriors using low technology weapons. They will attempt to defeat US forces before destroying them by attacking the C4ISR systems that give unity to dispersed forces. They will avoid decisive engagement. They recognize that the United States cannot employ forces that it cannot deploy, and they will attack deployment capabilities at points of embarkation and debarkation and at all points along our lines of communications—an enduring and critical vulnerability. They will be patient and will be willing to endure the hazards of war for many years.

Our dominance in standoff warfare, i.e., the coercive use of force without direct engagement, will also meet with an asymmetric response. Coercion is not compellence. The strongest form of asymmetry—far stronger than the destructive advantage we have—is an asymmetry of interest. The unwillingness to risk US troops speaks to half of the asymmetry. Those we hope to coerce may have much more at stake and may therefore have a stronger will. When the issue appears resolved, we will leave and they will stay. The enemy need not win; he needs only to survive to avoid losing.

In another effort to understand the nature of wars against asymmetric threats, we conducted an analysis of the Cold War paradigm, i.e., the major power/3GW paradigm, and compared it with the future war paradigm. It is possible to discuss both paradigms in terms of their approaches to the functions of planning, training, and adapting. It is possible to understand the major power/3GW paradigm as the “output of large organizations functioning according to standard patterns of behavior.”⁸ In the Cold War, these standard patterns developed over time and became routine and institutionalized. The underlying design assumptions were forgotten and habitual relations and practices became part of the unquestioned way of doing business. Although these techniques were honed and optimized for efficiency, effectiveness, safety, or other measures of merit, there were few questions about their basic rationales. Regardless of the nature of a new task, the defense establishment’s response was generally limited to its existing patterns of

⁸ Allison 1969, pp. 689–718.

behavior. To prepare for the Cold War, the United States developed three distinct organizational responses for *planning*, *training*, and *adapting* that persist today as dominant patterns of behavior despite the fact that the world has changed and many of the old assumptions are no longer valid.

The legacies of the Cold War are many. The Soviets were a formidable force to contend with, and we studied that force continually for decades. We knew, with a reasonable amount of certainty, the enemy order of battle, his methods of operations, the equipment he could bring to bear, and the terrain upon which we would fight the war. The Soviets were doctrinaire; they based their doctrine on solid theoretical foundations. They used centralized planning and they gave their tactical commanders little latitude. Much was *fixed*; if and when the war would be fought remained a *variable*.

There were three largely independent aspects to the US response. The first was the deliberate planning process for the higher levels of war. The second was training in the execution of those plans. The third was adapting to the threat in the context of a long-term technological competition between two great power alliances.

A. Planning the Higher Levels of War

During the Cold War, the defense establishment developed a complex deliberate planning process whose principal output was a lengthy operations plan including time-phased force deployment data that specified movements of units in detail. In theater, our detailed knowledge of the enemy and the environment led us to produce voluminous catalogs of targets matched to preferred means of target destruction and doctrinal templates that aided in the prediction of enemy intent based on his physical disposition. We institutionalized deliberate planning in US defense culture—in Washington and in the field.⁹ Because it was deliberate, it was not necessary to train staffs in the planning process itself. Plan development was an ongoing process that did not require specific training events.

⁹ Deliberate planning is the subject of an 18-month Joint Strategic Planning process that is repeated every 2 years. Deliberate planning is distinct from the crisis action planning that is commonly practiced by naval expeditionary forces, XVIII Airborne Corps, and special operations forces, for example. Products of the Joint Strategic Planning process range from the very specific and detailed to the non-specific. The most specific and detailed operations plans are prepared for the country's major regional conflicts and include a variety of annexes and time-phased force deployment data (TPFDD) that specifies units by name and their movements in detail. More vague and less threatening scenarios result in operations plans in concept format and do not include TPFDDs.

B. Training to Execute Plans

Plan development being the purpose of the deliberate planning process, the DOD developed a training methodology for training commanders and staffs based on training *plan execution*. The classic training event was, and still is, conducted in real time, begins with the first shots, runs 24 hours per day for 5–7 days, executes a previously constructed plan, and traverses a single path in detail through a very bushy tree of decision possibilities.¹⁰ Typically, two full echelons of command and staff constitute the primary training audience. If the training audience is tactical, real forces and equipment are in the field, in the air, or at sea. If the training audience is of a higher echelon, then some form of simulation represents echelons below the training audience. The primary values of such events include integration of the force elements that usually train separately in garrison, the opportunity to practice daily decisionmaking and staff procedures, and the opportunity to diagnose and repair deficiencies. Issues such as crisis response; coalition formation and maintenance; task organization; deployment; reception, staging, onward movement, and integration with the force; sustainment; crisis termination; and peacekeeping and reconstruction are assumed away in this form of training.

This form of training follows only a single path through a complex decision space; it ignores the need to train individuals, units, and staffs to adapt to the wide range of issues that are critical in the context of future wars. In other words, it fails to train for adaptability. All training must offer repetition with feedback. In training for adaptability, exercising branches and sequels is far more important than exercising a single path through the decision space.

Perhaps the most insidious consequence of training commanders and staffs on plan execution is that it trains entirely in the tactical time frame and ignores the higher levels of war. In this Cold War paradigm, strategic and operational thinking are the domain of deliberate planning and not the domain of training. The problem with this approach is that training in the tactical time frame denies senior officers the opportunity to train—to receive repetition and feedback—in strategic and operational decisionmaking.

¹⁰ This description is characteristic of the exercises conducted by the European Command's Army and Air Force components at the Warrior Preparation Center, by the Army's Battle Command Training Program, and more recently by the Joint Forces Command in its Unified Endeavor series. For a more thorough discussion, see Worley, Vernon, and Robert E. Downes 1996.

Just as commanders and staffs trained to execute a deliberate plan, individuals and units trained to execute predetermined tasks according to specific conditions and standards. These tasks, conditions, and standards (TCS) could be defined in detail precisely because we knew who the enemy was and how he was likely to fight. The development of TCS training was a revolution in its time and led to major improvements in the skill levels of individuals and units in all the services. With the evolution of unpredictable future wars, the ability to define task, condition, and standard with precision has largely disappeared.

C. Adapting over the Long Term

In addition to the planning and training responses, a third response—adapting to change—solidified under the force development process. The products of force development include doctrine, organization, and equipment. A long-term intelligence process focusing on developments in the Soviet Union supported the force development process. In the Cold War paradigm, each service implemented the force development process separately and in a way suited to its unique functions.¹¹

The combatant commands, i.e., the user chain of command, nominally generated the requirements that drove the force development process. But as often as not, force developments were driven by technological opportunity, the need to replace aging weapons, and visions within the various service organizations in the producer chain of command. Deterring and defeating the threat was the responsibility of the warfighter in the user chain of command. Adapting to the changing threat was the responsibility of the stateside combat developer. Doctrine, organization, and especially weapon system development often took 15 years or more. It is possible to characterize adaptation during the Cold War as a long-term technological competition between super powers.

In summary, the result of the past several decades of preparation is a complex of sophisticated processes spread across the Department's bureaucracy, each office orienting on a different time horizon and each bringing different specialized skills to bear. One element of the larger process is the deliberate planning that produces

¹¹ The Army and Marine Corps use the term *combat development*, the Navy speaks of *warfare development*, and the Air Force speaks of *doctrine development*. The generic term is *force development*. The Army's Training and Doctrine Command, the Marine Corps Combat Development Command, Navy Warfare Development Command, and the Center for Air Force Requirements and Concept Development are the service force developers.

voluminous plans every 2 years. A separate training process produces individuals, units, and staffs trained to doctrine, and to doctrinal standards (i.e., task, condition, and standard), to accomplish the specific missions derived from operations plans. The force development process is the third element. Force development deals with the continual challenge of absorbing new technology and weapon systems into the force and of responding to advances in the Soviet force. The nature of the NATO-Warsaw Pact conflict brought an extreme focus on the first battle, and we did not expect the Soviets to change doctrine or equipment during that crucial fight. Warfighting commands trained to execute tasks doctrinally in real time; they did not train to adapt in real time at the strategic, operational, or tactical levels of war.

D. Shifts to Adaptive Training

This review of the changing national security environment led us to the conclusions that form the basis for the recommendations in this paper. While each of the planning, training, and adapting functions remains relevant for future wars, we concluded that the DOD needs to make significant changes in their implementation. The key change in the paradigm is the need to be able to adapt to the uncertainties of the new environment. Because many of the assumptions underlying the design of the Cold War response are no longer valid—for example, the existence of a known threat with known doctrine and known order of battle—the implementing process needs to change and the bureaucracy needs to take on different roles. Many of our current organizational responses continue to rely on those now invalid Cold War assumptions and are, accordingly, themselves no longer valid. We must adjust our practices in light of the new assumptions associated with future wars. To determine the necessary changes, we must first identify the more prominent elements, or assumptions, of the new environment.

Separate processes for planning, training, and adapting cannot accomplish preparing for today's uncertain environment. Today's training system must emphasize crisis action planning in command and staff training rather than relying on deliberate planning. The training system must train commanders and staff in the strategic and operational levels of war, not just in the tactical. It must train the force, from top to bottom, to adapt in the planning process, while en route, and while engaged. The training system must adjust the concept of training to TCS to include the ability to adapt a task to the uncertainties of the new environment, i.e., to adapt a task to new conditions as they evolve.

Absent a known enemy and instead facing a variety of threats, each with its own character and ability to evolve, our forces must be able to configure an appropriate initial response and to adapt throughout the engagement. In other words, today's forces must train to adapt across the entire range of doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF). They must be able to experiment with and select the appropriate combinations of arms, tactics, organizations, and strategies during the planning process, en route, and throughout an operation. Stateside bureaus were once responsible for developing new tasks, task organizations, and doctrine, but the forming command, i.e., the Combatant Command (COCOM), and the engaged force, i.e., the joint task force, must now perform these functions. In all aspects of its operations, the force must be prepared to adapt rather than merely to execute fixed doctrine and tasks to standards.

Training and education must place greater emphasis on forming combined arms teams in response to an evolving threat.¹² The evidence from military operations in urban environments, for example, consistently shows that combined arms teams are required at the lowest tactical levels to deal with the urban environment.¹³ These small combined arms teams will encompass more than just the combat arms of a single service. For example, as in Afghanistan, they may include combat arms elements from multiple services. These teams will likely also include combat support and combat service support elements. The small combined arms teams do not exist in garrison or in doctrine. The unit that experiments with new combinations (methods of employing a mix of arms) is more likely to adapt to an evolving enemy than is a unit that trains to design standards against a doctrinal opponent. The problem then becomes one of training commands that can create novel combined arms teams—across branches and across services—from the lowest tactical echelons through the operational levels.

There are many impediments to exploring new combinations at the tactical echelons. In garrison, units are pure tank or artillery battalions, or fighter squadrons, for example. Units achieve *efficiency* through homogeneous branch and service units. Units achieve *effectiveness*, on the other hand, through the creation of heterogeneous combined arms teams. Training opportunities and ranges, such as the National Training Center, are

¹² Platoons in Korea frequently organize as combined arms platoons due to the restrictive nature of the defile fight. These formations consist of armor, mechanized infantry, light infantry, and engineers.

¹³ Worley, Wahlman, and Gleeson 2000.

optimized for a specific type of force and range of operations. Peacetime efficiency militates against combined arms effectiveness.

Repetition with feedback is a key to any training intended to improve performance. But what is to be repeated? The lower echelon land forces—e.g., fire teams, sections, squads, batteries, and platoons—are typically a single arm of infantry, armor, or artillery. Each drills and practices the fundamentals of TCS that are required of their specific branch and echelon. In urban and built-up areas—one of the classic asymmetric environments—pure formations are inadequate. A tank and an infantry squad are more effective than either alone can be. An anti-aircraft gun that can deflect upward to reach higher floors is also a useful complement to squad and platoon activities. A helicopter or Air Force gunship can provide continuous oversight and fire support. None of these combined arms teams exists in garrison.

A training event focused on adaptation at the lower echelons would give small unit leaders opportunities to task organize with a wider array of arms than is available in the pure unit. Repetition of the same tactical situation repeatedly is repetition of the wrong type. *If creating a new combined arms response is the skill to develop, then the process would present a new tactical situation, demand a response, provide feedback on its effectiveness, and repeat with a different situation.*

The problem extends well upward into the hierarchy. The Army had designed its divisions and has now designed its new modular brigade combat teams for a specific range of operations. It designed training opportunities like the Battle Command Training Program to train divisions in this specialized range of missions. In the new environment, the force at all levels must be designed to be competent across a broader range of missions, but optimized for none.

At any echelon, the command team may be the critical focus of adaptability. By *command team* we mean not only the classic chain of command but also chains of coordination in which parallel chains of command work together to achieve common goals. The command team also encompasses chains of functional support in which commands in different joint commands and services, as in the Defense Transportation System, must work together to provide the support a COCOM requires.¹⁴

¹⁴ Brown 2000, 2002, and 2005.

Adaptive training events do not replace the classic training event that integrates and offers opportunities for practice. They do not replace planning. They do require that DOD move training for planning into the training environment where adaptation is centered.

Strategic and operational decisionmaking will continue to be manifest in the products of deliberate planning, but decisionmaking at the higher planes of war must receive greater emphasis in training. DOD must design adaptive training events for the command and leader teams responsible for the higher levels of war.

Deliberate planning will continue, but crisis action planning must play a stronger role and thus must receive greater training emphasis. DOD must design adaptive training events to focus on the needs of crisis action planners.

The force development process will continue to evolve the force by exploiting the many advances in technology and to adapt to emerging threats, but commands at all levels must be capable of adapting as well. Thus adapting to change must receive significantly greater training emphasis.

Intelligence will continue to feed the force development process and the deliberate planning process, and intelligence will continue to feed operational commands at all levels, but intelligence must support adaptation to an evolving enemy in real time. Consequently, the intelligence process must receive greater training emphasis. Adaptive training events must train intelligence staffs to recognize and anticipate enemy evolutions.

The balance has shifted between what could be known and planned for in advance and what could not—between what was fixed and what was variable. In the post-Cold War era, less can be planned for and more must be dealt with through *in situ* interaction. Increasingly, being prepared will be less a product of deliberate planning, training plan execution to doctrinal standards, and long-term force development processes. In the future, being prepared will be more a product of warfighting organizations that are trained in crisis action planning, in adapting missions and tasks to meet the challenge of an asymmetric threat, and in adapting the elements of DOTMLPF to better meet the challenges of an adaptive enemy. This will be true in any future war—large or small; 3^d, 4th, or 5th generation; major or small power.

IV. DEFINING THE PROBLEM

A. Responding to Asymmetric Threats - Learning to Adapt

Figure 1 depicts graphically the training problem the United States is attempting to come to grips with as the nature of war changes from major power/3GW to the future wars we anticipate. The situation as IDA sees it is that training methods designed during the Cold War when the US had a known threat, while still important, are no longer adequate for the much broader, more complex, and more ambiguous range of threats we face today. Even so, the Cold War training model has improved significantly since 1990, and DOD trainers have learned how to adapt the Cold War model to the realities of the new threats we face in Afghanistan and Iraq.

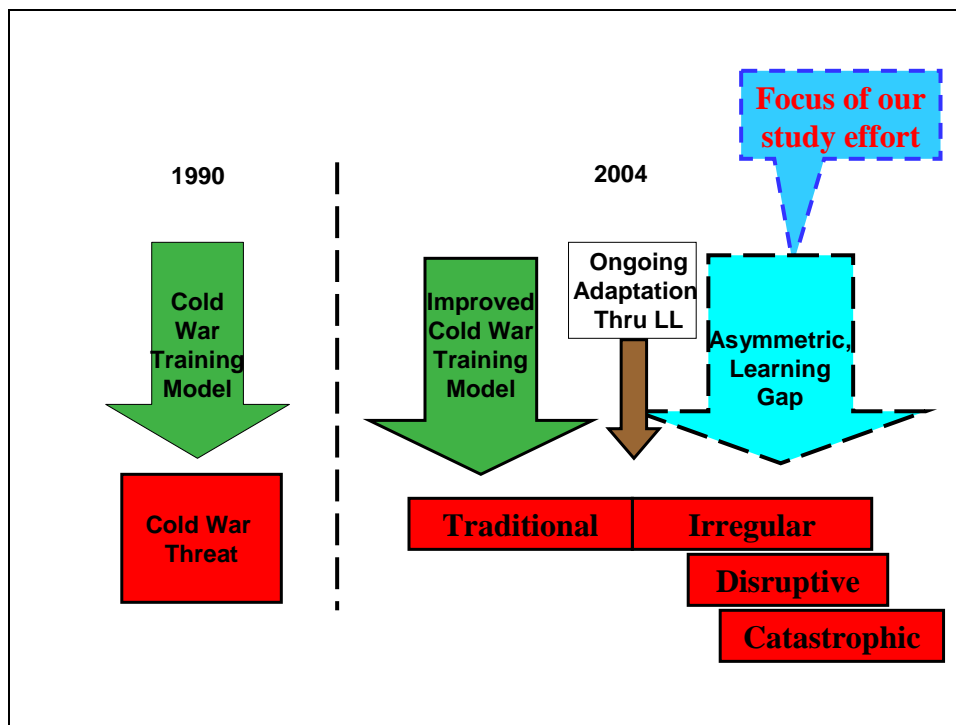


Figure 1. The Problem of Learning to Deal with Asymmetric Threats

We have identified two aspects of training for asymmetric war. In Figure 1, the large green arrows represent the standard training model based on TCS, and the small brown arrow represents training for known aspects of asymmetry, such as the training US forces going to Iraq are undergoing today. This training is based on lessons learned from the ongoing conflict. This training is for known asymmetries and is essentially the same approach to training that the DOD developed to respond to the Cold War threat. The IDA

team focused initially on this area and tried to identify lessons that DOD might learn and transfer into training events. Following an extensive review of lessons learned as well as joint and service efforts to adjust training techniques to those lessons, we concluded that DOD appears to be doing a good job at this aspect of training for asymmetric war.

These initial efforts led us to recognize other aspects of future war that DOD was not or could not cover in the context of a lessons learned effort. These other aspects go beyond the known threats we face in Afghanistan and Iraq but fall into the categories of irregular, disruptive, and catastrophic threats that are being addressed in the context of DOD efforts at capability-based planning. Accordingly, we have focused our efforts on the unknown aspects of asymmetric war (represented by the blue arrow) and have characterized them as the “learning gap” that exists at both ends of the spectrum of asymmetric war.

Having developed the concept of the learning gap, we began to consider how it might be possible to modify the DOD learning establishment so that it might better prepare the Department to deal with these new threats.

As we moved into the second and third tasks of the study and began to look at current training and education curricula, we noted that most DOD learning activities were focused on learning the tactics, techniques, and procedures (TTP) associated either with the Cold War or with the lessons learned from Afghanistan and Iraq. In general, DOD training did not appear to focus on preparing either individuals or units to face the uncertain spectrum of threats that we saw associated with future war.

With this realization, we became concerned that the existing concepts of training for task, condition, and standard that have become the focal point of most DOD training activities might be becoming less relevant to the department’s needs. The uncertainties of are too numerous, and it is difficult to predict the capabilities and associated tasks, much less the conditions and standards, that DOD will need to deal with these asymmetric threats.

While the concepts of TCS will still be relevant for many of the tasks that individuals and units perform, the demands of future war seem to call for the development of a learning environment that goes beyond training for predictable TCS. This new learning environment must prepare both individuals and units to respond effectively to unpredicted, asymmetric threats.

These concerns led us to our first conclusion about the DOD learning environment—that the DOD learning establishment must expand both education and training opportunities to prepare individuals and units to meet the demands of future war. In the first instance, this is a call for training and education in the identifiable aspects of future war. Much is known and can be incorporated now. Much more study and research are needed to better equip the learning establishment for this new task. We conducted a small survey of the curricula of a number of educational institutions and concluded that very little attention was paid to this new form of warfare. Accordingly, while we focus the majority of our research efforts on the need to learn adaptability, we believe that the DOD learning establishment would be better served if the time and effort it now spends on providing information to individuals and units were redirected and significantly expanded to address all aspects of future war.

Given the uncertainties and complexities of future war, we concluded that this first step was necessary but not sufficient to meet the needs of the new world. The learning establishment must also prepare individuals and units to operate in an environment of great uncertainty where individual leaders at all levels and units of all kinds will be forced to adapt rapidly to changing conditions. In fact, the literature associated with future war frequently asserts that the key to success against an asymmetric threat in this new world is to be adaptable. In a recent Army white paper Army Chief of Staff Peter Schoomaker and the Secretary of the Army Les Brownlee made exactly this point when they said, “Our Army today confronts the supreme test of all armies: to adapt rapidly to circumstances that it could not foresee.”¹⁵

The Secretary of Defense 2003 Summer Study, “The Military Officer in 2030,” reinforced the need for adaptability. This study based its findings on two key facts. First, the officers who will lead the US military in 2030 are already in the military or soon will be. Second, we cannot predict the threats and decisions they will have to face in the future. Given these facts, the summer study concluded, “We can agree that what will be needed are more flexible and adaptable officers and a more flexible and adaptable officer corps.”¹⁶

Given this lead, the IDA team began to focus on the concept of adaptability—to understand what it was, how to get it, and by what means could the DOD learning

¹⁵ Schoomaker and Brownlee 2004.

¹⁶ Director, Net Assessment, n.d., p. 41.

establishment enhance adaptability in individuals and units. Thus, we began a search for skills that would prepare individuals and units to deal with these demands. Our first step was to study the research efforts of the US Army Research Institute for Behavioral and Social Sciences (ARI). ARI is the Army's lead research laboratory for training, leader development, and personnel research. We discovered that ARI has been conducting training research and experimentation in this area for years. This review of ARI research led us to other training and psychology research that has served as the basis for our conclusions about the need to develop skills and abilities, i.e., metaskills or metacompetencies,¹⁷ which can serve as the basis for adaptability.

B. DOD Positions on Adaptability

We were not alone in concluding that the DOD learning establishment should change to respond to the demands of future war. While the evidence of major changes remains elusive, the senior military leadership in the joint world and in each of the military services is calling for change in the learning environment in response to changes in the external environment. In September 2004, the Chairman of the Joint Chiefs of Staff had this to say about this issue:

The US military must overcome the way it has trained and educated leaders. Defense officials are moving ahead to overcome Cold-War era training to create a new generation of leaders who aren't constrained by what the doctrine says.¹⁸

Despite this statement from the Chairman, we have not found any evidence of efforts to enhance adaptability learning in the joint training environment.

The Training Transformation Implementation Plan, to include the Joint National Training Capability (JNTC) and the Joint Knowledge Development and Distribution Capability (JKDDC), states that the DOD needs to transform the way it conducts training and that training must prepare the force to learn, improvise, and adapt to constantly changing threats in addition to executing doctrine to standards.¹⁹ Our review of both JNTC and JKDDC suggests that neither is actively engaged in explicit training for greater adaptability.

¹⁷ Metaskills or metacompetencies are skills or competencies that cut across specific content or skill areas.

¹⁸ US Air Force 2004.

¹⁹ Department of Defense 2004, p. 1.

1. Army

Of the four services, the Army is the most explicitly committed to developing adaptability-related skills in its service members. General Schoomaker, the Chief of Staff of the Army, has initiated a number of changes designed to enhance the Army's ability to adapt to the unpredictable demands of future war. Key examples are the development of a modular force and the changes he has initiated in Army personnel and staffing systems. The Army training and education system is also undergoing significant change as well.

The Army Training and Leader Development Panel (ATLDP) study was the genesis of many of these latter changes, which set the stage for the development of self-aware and adaptable leaders. The Army is working hard to develop the learning opportunities to support these goals. We have drawn many of our conclusions about the need to learn adaptability from the ATLDP, which made the following major points:²⁰

...Given the ambiguous nature of the operational environment, Army leaders should focus on developing the "enduring competencies" of self-awareness and adaptability. In this context, self-awareness is the ability to understand how to assess abilities, know strengths and weaknesses in the operational environment, and learn how to correct those weaknesses. Adaptability is the ability to recognize changes to the environment; assess against that environment to determine what is new and what to learn to be effective; and the learning process that follows...all to standard and with feedback....

...Self-awareness and adaptability are symbiotic; one without the other is useless. Self-awareness without adaptability is a leader who cannot learn to accept change and modify behavior brought about by changes to his environment. Adaptability without self-awareness is irrationally changing for change sake, not understanding the relationship between abilities, duties, and the environment....

Because these two competencies are so important, the ATLDP describes them as metacompetencies that enable lifelong learning. Mastery of these metacompetencies leads to success in using many other skills, the ATLDP explains:

The operational environment requires lifelong learning by Army officers and units that have ingrained the metacompetencies of self-awareness and adaptability as the most important skills and characteristics requisite for mission success in the Objective Force. (p. 3)

²⁰ Department of the Army 2002, p. OS-3.

Given these requirements for the development of self-aware and adaptive leaders, the ATLDP concludes:

Army training and leader development programs do not develop self-aware and adaptive leaders. The lack of a single proponent for training and leader development divides attention and resources between these two key programs and results in their competing for resources. The Army's current leader development model is outdated. The Army has no balanced, integrated and progressive training and leader development model that shows how it thinks about training and leader development. It has no process to periodically assess and provide feedback on the components of training and leader development that leads to decisions for establishing priorities and allocating resources to sustain or improve them. The Army, as a learning organization, needs leaders that value lifelong learning through a balance of educational and operational experiences rounded out by self-development. (p. OS-17)

The ATLDP also described a need for the Army to provide opportunities for lifelong learning:

Learning organizations support self-awareness and adaptability. Lifelong learning requires standards, tools for assessment, feedback and self-development. Part of Army Culture should be the commitment by its leaders to lifelong learning. This is done by balancing educational and operational experiences and by emphasizing self-development to fill the gaps in knowledge that educational and operational experiences do not provide. To be a learning organization, the Army must develop, fund, and maintain an Army-wide Warrior Development Center using information technology. This will allow soldiers, leaders, and units to find standards, training and educational publications, assessment and feedback tools, and access to distance and distributed learning programs for self-development and lifelong learning. Self-development enables officers to gain knowledge not learned from educational and operational experiences. Most officers understand the importance and role of self-development in lifelong learning....

Army training and leadership doctrine does not adequately address lifelong learning, the Army leaders do not emphasize its value, and the Army does not provide the tools and support to enable its leaders to make self-development an effective component of lifelong learning. Self-development requires feedback on performance from AARs, mentors, counseling, 360-degree feedback, etc. Many perceive self-development merely as a way to cut costs associated with schooling rather than accepting the potential of self-development as a means toward lifelong learning. Self-development should be the foundation of a professional's

lifelong learning process by effectively linking operational and educational experiences with the tools to fill knowledge gaps. (pp. 17–18)

The ATLDP made the following recommendations designed to develop adaptability in Army leaders:

- Provide the doctrine, tools, and support to foster lifelong learning through balanced educational and operational experiences supported by self-development.
- Provide the doctrine, tools, and support to inculcate the concept and practice of lifelong learning, self-awareness, and adaptability in the Army's culture.
- Teach the importance of lifelong learning and the metacompetencies of self-awareness and adaptability throughout the Officer Education System. Strengthen this approach in organizations and in self-development.

The Army Research Institute has done a lot of research on the development of adaptability and made the case for it in a recent newsletter.²¹

US Army Future Combat System of Systems (FCS) planning documents specifically call out the requirement to “develop, through training and experience, thinking, confident, versatile, adaptive, and seasoned leaders at the tactical level required for the digitized, rapidly deployable objective force” (TRADOC PAM 525-3-90/O&O, July 22, 2002). Leaders must be trained to think clearly and accurately in future dynamic battlefield environments that will place high demands on their mental agility. If we are to routinely prepare leaders for future operations we must greatly improve upon today's leader training and development methods. One solution that appears to be very promising is focused, deliberate practice in the area of battlefield thinking. When that training method was tested at TRADOC schools, students made dramatic gains in basic tactical thinking.

Adaptive Thinking

After years of study and reading, Army officers typically develop a good understanding of the elements of tactical decisionmaking. However, that knowledge alone, no matter how extensive, is not sufficient to produce good adaptive thinking. Thinking is an active process; it is a behavior one does with his or her knowledge; it is not the knowledge itself. To produce good military adaptive thinkers one must train a performance—a thinking performance—in much the same way that one trains any skilled, well-rehearsed, and extensively practiced behavior to enable expert performance.

²¹ Army Research Institute 2004.

In military terms, adaptive thinking has been used to “describe the cognitive behavior of an officer who is confronted by unanticipated circumstances during the execution of a planned military operation (Lussier, Ross, & Mayes, 2000).” The conditions in which the thinking task must take place are an essential and defining ingredient. The thinking that underlies battlefield decisions does not occur in isolation or in a calm reflective environment; it occurs in a very challenging environment. Commanders must think while performing: assessing the situation, scanning for new information, dealing with individuals under stress, monitoring progress of multiple activities of a complex plan. Multitudes of events compete for their attention.

Deliberate Practice and Adaptive Thinking

It is a common belief that “practice makes perfect.” In almost any task, initial performance is characterized by inefficient and ineffective behavior. Repetitive performance causes behavior to become automatic; it is performed more smoothly with less effort and attention. In a complex activity like battle command, expert performance levels cannot be attained without relying on the automaticity resulting from past performance; battle command is far too complex to “think your way through it from scratch” under tough battlefield conditions.

But practice alone will only increase the level of automaticity of the tasks; it will not efficiently perfect the manner in which they are performed. It is also important that the behaviors that become ingrained conform to those of an expert - that they are the right behaviors. Thus, in deliberate practice, one must pay attention to how one performs and actively correct the manner of performance. A key component is quality coaching, as subject matter experts observe and guide students with regard to the expert behaviors. Practice must be repetitive enough so that the behaviors remain in the correct form, even when one stops consciously attending to them. Thus, while practice certainly tends to improve performance, the performance gains expected depend heavily on the composition of the training environment, the use of effective coaching, and the quality of feedback.

The study of tactical experts by ARI researchers has revealed a number of common elements to the framework of their thinking, called Themes of Battlefield Thinking. They represent the core of our adaptive thinking training. The themes are not intended to be a checklist, rather they are designed to support the deliberate practice of tactical thinking.

We recognize that leadership in complex adaptive systems relies on relationship-building over role-defining, loose coupling over standardization, learning over knowing, self-synchronization over

command and control, and emergent thinking over planning based on estimates.

A contingency-based and responsive Army must place an enduring premium on a soldier that can work at any level within the spectrum of warfare. The vision of such a soldier, and the Army to which he belongs is one of leadership that is flexible and adaptive. These leadership traits can only become intuitive to our leaders through a system of education and training for both officers and noncommissioned officers that continues to be innovative, sequential, and extensively resourced at all levels of training throughout the transformational Army.

Dr. Leonard Wong of the Army Strategic Studies Institute at the Army War College has recently completed a study of the impact of Army operations in Iraq on junior officers. Wong concluded that the ability to adapt to the uncertain, complex environment in Iraq was key to accomplishing the mission.²²

Junior leaders in postwar Iraq are learning to be adaptable and agile. They are taking on roles they never envisioned; they are learning to shift mental models rapidly. They are developing the leadership ability that the Army has been seeking for many years, yet has struggled to capture. While many deployed officers do not see the transformation they are undergoing in the crucible of OIF [Operation Iraqi Freedom], some do. One field artillery lieutenant reflected. It wasn't exactly what I thought it would be because I pictured myself fighting laying steel down, destroying stuff. But this is fine; this is what it is about. It is about being flexible. It is about being able to conduct any mission as a soldier first and a leader first not worried about being an artilleryman first.

In OIF, many of the situational variables that normally substitute for leadership in the nondeployed Army are removed. For example, many officers reported that their missions were not covered by Army doctrine or established TTP [tactics, techniques, and procedures]. Officers spoke of improvising and experimenting in operations such as the employment of heavy units in a MOUT [military operations in urban terrain] environment, patrolling in a nonhostile MOUT terrain, and conducting Phase IV (nation-building) operations in a situation void of many of the agencies and organizations normally expected in reconstruction. As a result, junior officers are having to rely on their own judgment and ingenuity in getting the mission accomplished. One lieutenant perceptively noted, "Every environment that we as a military go in, we are going to learn something. For those of us who are learning it now, we'll be the ones to write the doctrine later to help out the next set."

²² Wong 2004, p. 21.

Today's junior officers are learning to lead in the crucible of the extremely complex and dynamic OIF environment. Lieutenants and captains have conducted missions for which they never trained, executed operations that have outpaced Army doctrine, shifted constantly from adrenaline-pumping counterinsurgency to patience demanding nation-building, and received very little detailed guidance or supervision in the process. The result of this experience is a cohort of junior officers that is learning to be adaptable, creative, innovative, and confident in their abilities to handle just about any task thrown at them.

2. Navy

The Navy sees adaptability not as an individual competency but as an innate attribute of operational units and as a reflection of the process by which the institution responds to change in a systematic way. As such, it seems unaware of the issue of educating individuals or training units to be adaptable.

While the Navy has established goals that imply that its personnel will be adaptive in their outlook and their approach to both force development and operations, it has not emphasized the development of adaptability as a core attribute of its leaders. In particular, it has not structured its education or training to develop adaptability as a recognized characteristic or competency in its personnel and, especially, in its leaders.

Training and education organizations in the Navy base their programs on requirements generated by the fleet. With regard to individual training, the fleet has not identified a requirement to train to adaptability. With regard to the training of operational units for deployment, the Joint Maritime Forces Commanders, as component commanders for the Combatant Commanders, have indicated that current training is supporting the Combatant Commanders' requirements; the current focus on training to core skill sets is the right objective. In other words, there is no demand from operational commanders for a more adaptive force.

The Navy continually reinforces its own self-perception that it is *inherently* an adaptive force. Its response to the South Asia Tsunami is the most recent example cited. Another example, more focused on combat functions, comes from the lessons learned report of a battle group commander departing the Persian Gulf region: "Admiral, this deployment has reinforced to me the truly adaptive nature of naval forces. It's our greatest strength...we adapted so that we could meet every challenge."

Navy leadership does recognize the need to change in response to a changed or changing environment. The CNO has focused the organization on "leading change" and

the need for bold and creative people in an organization that embraces innovation and improvement. Nevertheless, the leadership's emphasis in responding to change has not been in the day-to-day operations of fleet units. Rather, the emphasis has been on force structure, on aligning the organization to achieve effectiveness and efficiency, on adapting to and taking advantage of new technologies, and on adopting new business practices and management techniques.

The development of strike groups, composed of different combinations of ships than in the older battlegroups and amphibious ready groups, does reflect an operational change, but the capabilities that each of these groups trains to are the traditional core capabilities of anti-air, surface, and underwater warfare. Response to the challenges of future war is considered to be additional attention to antiterrorism and force protection, extended maritime interdiction operations, gas and oil platform protection, close air support in an urban environment, and rules of engagement and cultural sensitivities (no-hit, no-strike zones). The Navy, however, deals with each of these areas or concerns in the context of the training in the core capability areas. No effort is devoted specifically to preparing and training either the leadership or the organizations to respond in an imaginative and adaptive fashion to the unpredictable low-level and time-sensitive challenges of future war.

An example of a need for greater emphasis on creative and adaptive thinking relates to the exercise Millennium Challenge '02. When the Navy was opposed by a thinking enemy, moreover an unconventional thinking enemy, it lost 16 of its ships—a carrier, five of six amphibious ships and several cruisers—on day two of the war. Navy leaders responsible for designing in-port and at-sea training indicate that, despite this experience, there has been no specific response to Millennium Challenge '02 in terms of a change in training focus or methodology. In fact, those leaders responsible for training are basically unfamiliar with Millennium Challenge '02 and whatever lessons it taught, despite the huge amount of time and money devoted to it.

Adaptability as a leadership competency has not been a focus of attention for those responsible for providing leadership education and training in the Navy. Adaptability and flexibility are on a list of metacompetencies being developed by the Navy's Human Performance Center, but they do not appear to have been formally included in the training regimen.

Of potential significance, beyond the issue of any particular competency, is the lack of focus or high-level leadership concern with regard to leadership education and

training in general in the Navy. The CNO has approved a Navy Leadership Competency Model, which the Navy patterned after an OSD model. However, in general, the Navy has geared all of the competencies to business, to organizational development, to the application of technology, and not to warfighting. At the same time, there does not appear to be any specific written guidance from the CNO on leadership goals or leadership education and training. If there is, those responsible for leadership education and training are unaware of its existence. In fact, the Commanding Officer (CO) of the Center for Naval Leadership, responsible for all leadership training in the Navy beyond the accession stage, has indicated, “Other than the somewhat indirect references to leadership training in various [documents], [he] receives no other clear cut goals or guidance.” He does have leadership development continuums for the officer and enlisted communities and a Navy Leadership Competency Model with which to work, but those do not address the issue of adaptive leadership, particularly in an operational environment.

The CO of the Center for Naval Leadership indicates that, in fact, he is the one responsible for developing leadership training goals and programs “based on requirements established by the Leadership Job (task) Analysis process and subsequently validated by the fleet.” In other words, the Navy treats leadership as a task that requires certain skills depending on the specific job or the rank of an individual. Since little in the day-to-day responsibilities of most naval leaders is related to unanticipated operational requirements or the challenges of asymmetric warfare, one would not expect that the job analysis process would lead to a requirement to produce operationally adaptive leaders or leader teams.

If there is a consistent thread to Navy leadership training, in both the accession phase and in follow-on leadership continuums, it is the emphasis on character development and management skills. The focus is on positional requirements—getting the day-to-day job accomplished.

The leadership themes stressed throughout an officer’s career are the Navy’s core values—honor, courage, and commitment—and internal organizational leadership and management issues. These include such topics as:

- Duty to and development of subordinates
- Process improvement and process oversight/ownership
- Data-based decisionmaking and process management
- Command climate and diversity

Even at the CO level, emphasis is on the organizational aspect:

- CO responsibilities under the law
- Providing purpose, direction, and motivation
- Enhancing mission effectiveness
- Combat/crisis leadership

Preparing leaders to meet operational challenges in imaginative and creative ways does not seem to be a concern in this process.

Finally, much has been made of the Navy's Revolution in Training. The Navy's leadership training continuum and opportunities for leadership and management education and training through e-learning are included in the products of that revolution. However, the real focus of the revolution is the method of delivery. The revolution in training is really about the process:

- Identifying job requirements
- Ensuring that each sailor has the training required for his job
- Delivering training at the right time, to the right person, with the least cost, in the least amount of time

The revolution in training does not address the need to prepare Navy leadership to cope with asymmetric threats and future war.

3. Air Force

The Air Force recognizes the need for adaptability in its organization for combat and in its development of new systems. In its 2004 Transformational Flight Plan the Air Force cites adaptability as one of its principal missions. Like the Navy, the Air Force adaptability-related focus is on development of new technology and new organizations much more than on training. The Air Force's transformation into an Air and Space Expeditionary Force (AEF) is perhaps the best example of the Air Force's emphasis on adaptability. This transformation, which began in the late 1990s, has proven to be an effective way to move the institution from a threat-based, forward-deployed force designed to support Cold War doctrine to a capabilities-based force that is sufficiently adaptable to carry out a wide range of global operations amidst a continually demanding operations tempo.

The Air Force understands that success in the 21st century demands that it provide Joint Force Commanders with robust, adaptable capabilities that enable them to

engage across a wide range of contingencies. This awareness has resulted in the development of focused battle laboratories that continuously evaluate how to integrate space, AEF, battle management, force protection, information warfare, and unmanned vehicles into joint operations. In particular, these battle labs, which explore new ideas and foster innovative technologies that improve combat capability, provide another example of how the Air Force is committed to technological adaptability via the mechanisms of its various operational platforms.

The Air Force has also responded to the changing demands of the warfighter by developing a Concept of Operations process that continually assesses planning, programming, requirements, and acquisition mechanisms in the context of a capabilities-based perspective. These CONOPS, covering all of the services' primary missions, outline the specific effects-based capabilities needed to solve problems as they emerge.

Recognizing that achieving the capabilities described above through the adaptive use of technology is not sufficient in itself, the Air Force is just beginning efforts to modify its culture and the process by which it develops its Airmen to be a more adaptable and responsive force. Doctrinally speaking, the Air Force understands the importance of adaptability in the development of its single greatest resource—its people. In this regard, the US Air Force doctrine document, AFDD 1-1, outlines how:

By ensuring each Airman's developmental experience is both valuable and meaningful, and by cultivating the enduring leadership competencies, the Air Force creates leaders who are more flexible and *adaptable* in a force that has an even greater sense of belonging and importance (p. 10, emphasis added).

To prepare for the changes ahead, the Air Force is reviewing its career development patterns for its officer, enlisted, and civilian force and has recently undertaken to re-assess how the Air Force conducts training across the force. Recent manifestations of these efforts include greater emphasis on the development of skill sets essential to individual adaptability, including critical thinking, self-awareness, and interpersonal maturity. To date these initiatives have been limited to various Professional Military Education and formal training venues as well as the expansion of the Air Force Expeditionary Operations School (EOS) curriculum. The EOS, as a function of the Air Mobility Warfare Center at Fort Dix, educates, trains, and exercises Expeditionary Combat Support (ECS) personnel prior to their exposure to deployed operations, i.e., Iraq and Afghanistan. The EOS is responsible for developing/conducting EAGLE FLAG

exercises to expose combat Airmen to realistic, threat-based scenarios reflective of the theater of operations in which they will operate.

The ultimate aim of the Air Forces developmental process is to prepare expeditionary leaders at all levels to succeed in both peacetime and wartime, a process built on mutual support and teamwork. To this end, in October of 2004, Air Force Chief of Staff General John Jumper unveiled a *Combat Wingman Program* designed to foster increased interaction and support for all members of the Air Force team. Essentially, the fielding of such a program serves as a tangible reminder that responsibility for the development of the members of the force belongs to everyone—commanders, supervisors, and Airmen alike. In support of this initiative, the Air Force is expanding its emphasis on team building, exemplified in the recent development of a team warrior week linking Senior NCO Academy attendees with lieutenants completing the Air and Space Basic Course—their first exposure to active-duty military life.

These ongoing initiatives suggest that the Air Force is beginning to address the development of adaptability-related skills; however, the Air Force must devote more initiative and resources if it wants to see the transformation it seeks. Therefore, the question the Air Force has yet to answer is, Will it follow through on developing an expanded learning environment that sets the stage for all Airmen and Air Force units to develop the skill sets that make them more adaptable?

4. Marine Corps

The Marine Corps has long understood the need for adaptability and has incorporated adaptability-related learning activities across the board. The basic Marine warfighting manual recognizes the need for adaptability as part of the Marine Corps' maneuver warfare philosophy. "Since war is a fluid phenomenon, its conduct requires flexibility of thought. Success depends in large part on the ability to adapt—to proactively shape changing events to our advantage as well as to react quickly to constantly changing conditions."²³

This philosophy is well suited for winning the small wars on which the Marine Corps has long focused, because it accepts the inevitability of chaos, complexity, and friction and the preeminence of the human element. Recognizing that even the simplest things in war are difficult, the Marine Corps concept of maneuver warfare and its focus

²³ US Marine Corps 1997, p. 17.

on small wars place a premium on flexibility and adaptability at all levels — strategic, operational, and tactical.²⁴ A previous Commandant of the Marine Corps was an advocate of the concept of the “three block war” and “the strategic corporal.” The current Commandant made a clear call for adaptability when he made this statement in his Commandant’s Guidance: “We will reward action that is guided by informed boldness and audacity. And, we will kindle a preference for responsive decisionmaking with room for errors and mistakes, while countering any institutional prejudices that punish initiative and undermine our warfighting capacity.”²⁵

The Marine Corps is explicit in its determination to maintain a vigorous education and training program to ensure that the Corps maintains its warfighting ethos and culture of adaptability. The Marines make extensive use of Tactical Decision Games (TDG), e.g., Decisionmaking Exercises, and even publish a TDG monthly in the *Marine Corps Gazette*. The Marines teach the substance of small wars and operations other than war at the Marine Corps University and seek to develop adaptability and cognitive skills in many of their courses. The Marines have been developing adaptability-related training programs for some time and continue to expand their efforts to enhance adaptability learning throughout the Marine Corps.

V. LEARNING ADAPTABILITY

Our review of the literature on adaptability suggests that the key elements listed in Table 2, below, need to be present if DOD is to become an organization capable of learning adaptability. The first element recognizes that it is insufficient for adaptability to be learned in only a few places, e.g., Army special operations forces. The reality is that all parts of DOD need to be able to adapt to the uncertainties and complexities of the 21st century. The second element comes through in all of our research on adaptable teams. The literature makes it clear that trust and cohesion are essential prerequisites for developing adaptive teams. More important, perhaps, is the recognition that human interpersonal dynamics trump technology. This is an important insight because it may be possible to change human interpersonal dynamics more rapidly than to incorporate new technology. The third element is a challenge to the DOD culture, which many describe as too steeped in micromanagement and adherence to established policies and hierarchy. As

²⁴ US Marine Corps 2004.

²⁵ 33d Commandant’s Guidance, January 2003.

described by Colonel Chris Paparone of the Army War College faculty, “An adaptable organization must cherish and support individuals who show talents of adaptability. Speaking truth to power can be one of the most heroic things we can do as senior leaders. Allowing the naked truth to be spoken to us from others can be even more challenging.”²⁶

Our research also gave us a number of insights into the process of learning adaptability. The first and most important point is that learning adaptability by itself is inadequate. Adaptable individuals and units must also be grounded in the fundamental skills associated with their missions. While a focus on training to existing doctrine and to existing concepts of task, condition, and standard—the elements of the first training revolution—is clearly inadequate in the future war context, a need to train to perform tasks will remain. We will have more to say on the tradeoffs associated with the competing demands for task training and adaptability training later in the paper.

Table 2. Key Requirements for Learning Adaptability

Key Elements of Military Adaptability	Requirements for Learning Adaptability
<p>Inculcation across the entire culture/service/DOD in all aspects of training</p> <p>Trust and cohesion: human interpersonal dynamics trump technical solutions</p> <p>A climate that accepts and rewards adaptable and creative individuals willing to speak truth to power</p>	<p>Training in basic skills</p> <p>Multiple training events with widely varying and frequently shifting tasks and conditions.</p> <p>Command climate that encourages experimentation and acknowledges failure as a possibility</p> <p>Feedback that focuses on adaptability, innovation, and outcomes rather than on performance to standard</p>

Also important for learning adaptability is the need to experience a wide range of training events with frequently shifting tasks and conditions so that the learner is routinely forced to adapt to new situations and is never allowed to get comfortable in any given set of tasks. Associated with this adaptability-enhancing environment is the requirement that the command climate be one that encourages experimentation and allows for, and even encourages, learning from mistakes.

Finally, the focus of feedback, i.e., After Action Reviews (AARs), must expand to address adaptability, innovation, and outcomes rather than performance to standard. Mentors and observer/controllers must focus more on the thinking process that led to an

²⁶ Paparone 2003.

operational decision more than on the correctness of the decision itself. The focus must be on how to think more than on what to think.

In addition to identifying factors that enhance adaptability, our research has identified factors that reduce adaptability. In his report for the Army on adaptive teams, Dr. Gary Klein lists the following factors that reduce adaptability in teams.²⁷

- Training for mastery places too much emphasis on mastering the routines of a particular task rather than on building a problem-solving repertoire.
- Training what to think, i.e., training the accepted wisdom or doctrine, rather than how to think, i.e., training on how to adapt to new challenges, limits the ability to adapt.
- Focusing on plan accomplishment ignores the reality that most plans become obsolete before they are accomplished and fails to recognize the need for adaptive teams that can replan rapidly. A team that focuses on achieving the commander's intent is more adaptable than a team that focuses on plan accomplishment. Similarly, a focus on predetermined performance standards and management objectives tends to reduce adaptability by preventing a team from setting its own goals.
- Rigid and centralized organizations tend to focus authority in the commander and tend to deny others the ability to adapt or work around a problem. Collection plans, templates, and commander's critical information requirements (CCIRs) assume that critical information needs can be determined in advance, which is unrealistic in a future war environment. The use of unskilled people to collect data also reduces adaptability because these people do not have the expertise and judgment to be able to see patterns and implications, nor are they able to see the implications of events that do not happen.
- Highly detailed and efficient plans limit adaptability because they are so difficult to change.

Another assessment of factors that reduce adaptability comes from Dr. Leonard Wong of the Strategic Studies Institute of the Army War College. Wong has written in detail about how certain structural aspects of the Army act to stifle innovation, e.g., adaptability. He makes the following argument in his paper:²⁸

²⁷ Klein 2001.

²⁸ Wong 2002.

The centralization of decisionmaking in the Army traditionally has been in the bureaucratic areas of administration, but over the years there has been a shift to increased control in the planning, execution, and assessment of small unit training. The ability to plan and conduct training at the company level has been taken away from junior officers by a system that increasingly directs the tasks to be trained, dictates the way training will be conducted, and then disrupts the training being executed. The result is an unpredictable and stifling environment of requirements, structure, and supervision that hampers most efforts toward innovation. Several factors contribute to the current leader development environment.

The situation in which the Army finds itself is oddly paradoxical. Future leaders should be adept at operating in unstructured, ambiguous environments, yet the Army is relying on a centralized, over-structured system to provide that capability. As a result, an entire cohort of junior officers is inadvertently being produced whose company command experience consists mainly of responding to directions and disruptions from higher headquarters. Discretionary time has been replaced by sergeants time, innovating has been replaced by reacting, and creativity has been replaced by certification.

Another critique of existing planning tools comes from Major Donald Vandergriff, whose research into the history of the Army personnel management system has revealed aspects of the military decisionmaking process (MDMP) that appear to be impediments to adaptability. Vandergriff, who has been teaching ROTC cadets for 5 years, has developed a new curriculum for teaching cadets that he and his colleagues designed to prepare them to be able to adapt to the challenges of future war. According to Vandergriff, the MDMP, which can be compared to the collection plans, templates, and CCIRs mentioned by Klein, evolved out the Industrial-age way of war (2nd Generation Warfare), and centered on the rote memorization of process. In other words, the Army has based a significant portion of its education system on memorization of the process, or a “checklist approach” to warfighting.

According to Vandergriff, the MDMP evolved from an attempt to develop a scientific, i.e., Newtonian, way to organize the preparation and execution of missions. This checklist approach to warfighting reflects a mistaken interpretation of the way the Germans were training officers and NCOs in the years prior to World War I. The Germans had developed training tools, i.e., tactical decision games that are discussed later in this paper, for teaching officers and NCOs “how to think.” The French, and then the Americans who copied the French, misinterpreted the German description of this training approach. They focused on the training process rather than the training objective,

i.e., how to think. The Americans later developed the process into the five-paragraph operations order and effectively converted what was originally a process for providing the answers to a tactical decision game into the process for planning.

Vandergriff argues that both the French and the Americans failed to recognize that the Germans were teaching “how to think,” not “what to think.” Because of this mistake, the Americans ultimately adopted the rules of the German training process as the process for military planning. The Americans developed the MDMP and later the five-paragraph field order; the task, condition, and standard, or TCS, approach to task training; and the crawl-walk-run training concept based on a mistaken interpretation of German training techniques. The reason this misinterpretation has succeeded in defining Army training techniques for so many years is that the mobilization-based Army, facing the need to train many soldiers quickly, has traditionally focused, and continues to focus, much of its training efforts on the need to train large numbers of officers and NCOs rapidly in the fundamentals and processes of military skills.²⁹

A number of researchers and educators have identified factors that enhance adaptability. In essence, these factors are the opposite of the factors that limit adaptability discussed above. Table 3 summarizes a number of the most significant of these factors. The main theme of these factors is to prepare for uncertainty by developing flexibility across a wide range of challenges. The important thing to recognize in this context is that the current TCS training paradigm is inconsistent with these factors. While we do not argue for the elimination of training in TCS, we do believe that training for future war must go significantly beyond the current paradigm. An alternative way to talk about this problem is to talk about identifying *new* tasks, conditions, and standards that more closely reflect the adaptability-related demands of future war.

²⁹ Vandergriff 2005.

Table 3. Factors that Enhance Adaptability

Training	Train with stress. Train problem solving under uncertainty. Train how to think. Train in the broad spectrum of missions associated with asymmetric war.
Performance Appraisal	Base appraisal on mission accomplishment.
Organizational Structure	Train decentralized.
Plan Features	Train to build flexible plans.

VI. THE COMPONENTS OF ADAPTABILITY

Our review of the literature revealed a remarkable consensus on the metaskills that are important to developing leaders and teams who can be effective in the context of a complex, unpredictable environment such as that found in future war. While there is little consistency in the actual terms employed, we have concluded that the five most important metaskills are adaptability, intuition, critical and creative thinking, the individual skills associated with self-awareness, and team or social skills. Sometimes the literature discusses these metaskills by themselves. Sometimes it discusses them in pairs or triplets. Sometimes it identifies them with completely different terms.³⁰ Nowhere did we find a model or taxonomy that included all five of these metaskills.

Our response to these findings has been to create a model, shown in Figure 2, that has adaptability as the central, overarching metaskill. Once we had identified adaptability as the critical skill for conducting effective operations in the future war environment, we recognized that adaptability, in addition to being a specific skill, can be seen as a function of the cognitive skills of intuition and critical and creative thinking, and the relational skills of individual self-awareness and team social skills. The basis for the model is our belief that the five metaskills are all related and that the concept of adaptability is most central to our goal of producing individuals and units capable of operating effectively in the new environment. The model also meets our goal of providing a parsimonious approach that might have meaning within the DOD learning establishment. We have vetted this model with appropriate experts and have not faced any opposition.

³⁰ For example, the literature on team skills discusses such skills as decisionmaking, which we include in intuition and critical and creative thinking; shared situational awareness and performance monitoring, which we include in self awareness; and interpersonal relations, which we include in social skills.

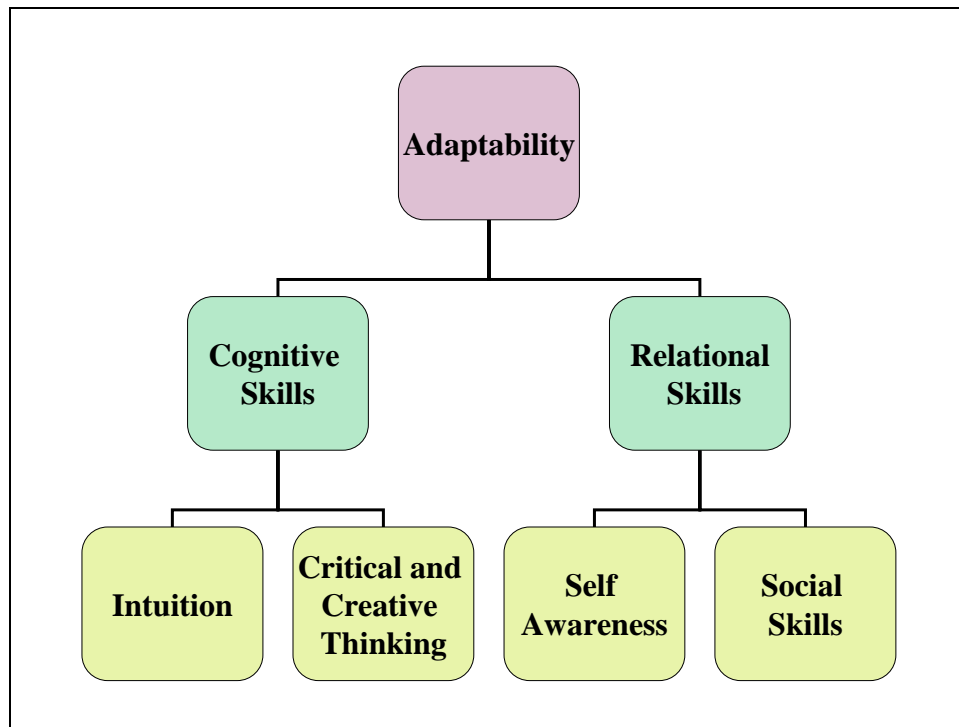


Figure 2. The Components of Adaptability

In the process of developing our adaptability-learning model, we investigated the set of theories associated with adult learning. We discovered that there are a number of major theories of how adults learn. Three of these theories, or “learning orientations,” are appropriate to our study:

- The behaviorist orientation, perhaps the earliest theory of learning, defines learning as a change in behavior. The focus of behaviorist research is on overt behavior, which is a measurable response to stimuli in the environment. DOD bases most of its education and training on the behaviorist orientation.
- The cognitive orientation focuses on internal mental processes. Cognitivists argue that the human mind is not simply a passive exchange-terminal system where the stimuli arrive and the appropriate response leaves. Rather, the thinking person interprets sensations and gives meaning to the events that impinge upon his consciousness. Our concepts of cognitive skills fall into this category.
- The social learning orientation argues that learning is a function of the interaction of the person with his or her social environment. Social learning theories highlight the importance of social context and the processes of

modeling and mentoring. Our concepts of relational skills fall into this category.

The key point in this short diversion into learning theory is the recognition that DOD bases most of its learning activities on one theory of learning whose focus is on observable, measurable behavior. The reality is that there are multiple theories of learning and some appear to be more appropriate to helping individuals and units learn to adapt to the changing, unpredictable nature of the 21st century. Cognitive and social learning theories appear to be consistent with our theory of adaptability learning.

A. Learning To Be Adaptable

While each of the five metaskills is an important component of the overall ability to adapt to the challenge of asymmetric threats, it is important to first note that individuals and units can train to be adaptable. One of the things that apply to both individual and collective skills training is that *repetition* of the object skill is central to performance improvement. Furthermore, *feedback* must accompany *repetition* to correct improper performance and to reinforce proper performance.

According to ARI,³¹ there is a positive link between experience in adaptive situations and adaptive performance. Gaining the same experience repeatedly, e.g., training the same task to the same standard, may not aid performance in a novel situation, and it may even hurt performance if the individual insists on approaching the situation from a particular mindset that might not be appropriate. However, experiencing a variety of situations requiring adjustments to the environment does appear to aid in the adaptation process.

Simply put, if the trainee is to adapt, then an adaptability-training event would require repeated adaptation. If developing new TTP in a small war environment were the object adaptive skill, then a training event would contain several iterations forcing commanders and units to develop new TTP to meet changing situations. If task organization were the object adaptive skill, then a training event would contain several iterations forcing task organization changes under stressful and changing conditions.

³¹ Army Research Institute 2005.

An adaptive training event for a commander and staff, in contrast to a classic training event, might, for example, be conducted in fast or skip time³² and run 8 hours per day for several days engaging the command and principal staff of only a single echelon. The training audience would prepare hasty plans, modify doctrine and task organization, and execute the assemblage. They would repeat this process multiple times, traversing as many paths as possible through a complex decision tree. Although the classic training event typically selects only one course of action for execution, trainees would explore several alternative courses of action in an adaptivity-training event. Doctrine and organization are necessary inputs to a classic training event; candidate modified doctrinal and organizational concepts are possible outputs of an adaptive event.

The adaptive training event should present the audience with a problem that it has not planned for, a threat that requires formation of new combinations of arms, and an enemy that will attack seams or weaknesses in doctrine. In short, the key to training to adapt is to have a properly constructed event scenario, skilled trainers, and an adaptive enemy. This is precisely what the concept of Red Teaming provides.³³

Individuals and collectives still must master the basics through education and training. Dave Brubeck was a classically trained musician before he became a master at improvisational jazz. Training in the fundamentals (marksmanship, flight skills, and staff skills, etc.) remains as important as ever.

Commanders and leaders at the tactical level must be prepared to adapt. The asymmetric actor may apply low-technology means and methods against US conventional forces. The asymmetric actor will continually adapt through trial and error, and the opposing US tactical commander, if shackled by limited doctrinal responses, will be the victim. General Montgomery Meigs, Commander of US Army Europe and US 7th Army, puts it this way:³⁴

We have become adept at replicating a set-piece enemy for our units. We do a good job of giving them an opponent that fights with consistent, predictable doctrine and tactical procedures. We must now move to the

³² An event conducted in fast time would represent more than 1 hour of real-world time in every hour of event time. An event conducted in skip time might represent decisionmaking in slower than real world time to allow greater deliberations, adjourn for the evening, and resume the next morning as if weeks or months had passed.

³³ See Appendix C.

³⁴ Meigs 2001.

next level and present an enemy that uses asymmetrical approaches and who learns from our Blue Force, adapting to avoid our strengths and to exploit our tactical weaknesses as he moves from battle to battle. ... Units must learn to anticipate the enemy's actions, find him, assess what he is doing, preempt him, and reassess....

B. Learning Cognitive Skills

As described earlier, our research into asymmetric threats led us to recognize the need to develop adaptability skills in individuals and units. Thinking about adaptability led us to recognize the need for the DOD learning establishment to develop the techniques necessary to ensure that cognitive skills, which are essential to dealing with the uncertainties associated with future war, are learned.³⁵ Although there are a number of skills that might be included in the category of cognitive skills, we have focused on two: intuition and critical/creative thinking. We believe these two skills comprise the set of essential, adaptability-related cognitive skills.

A recent IDA paper by John E. Morrison and J.D. Fletcher has developed a concept of cognitive readiness that has given us further insight into both cognition and adaptability.³⁶ According to Morrison and Fletcher, “cognitive readiness is the mental preparation (including skills, knowledge, abilities, motivations, and personal dispositions) an individual needs to establish and sustain competent performance in the complex and unpredictable environment of modern military operations.”

Morrison and Fletcher identified the 10 characteristics of cognitive readiness. In subsequent research, Fletcher identified three basic abilities related to cognitive readiness:³⁷

- The ability to recognize patterns in chaotic situations (we describe this as *intuition*).
- The ability to modify problem solutions associated with these patterns as required by the current situation (we describe this as *critical/creative thinking*).

³⁵ *Cognition* can be defined as the conscious process of knowing or being aware of thoughts or perceptions, including understanding and reasoning. Cognitive skills include such mental processes as knowing, thinking, learning, judging, and problem solving. Cognition can also be thought of as the process of acquiring knowledge, including perception, intuition, and reasoning.

³⁶ Morrison and Fletcher 2002.

³⁷ Fletcher unpublished.

- The ability to implement plans of action based on these solutions (we describe this as self-assessment and social skills).

Fletcher asks the question, “How do we prepare military personnel for the unexpected, which, by definition is something we cannot anticipate nor [sic] decompose into specific tasks, conditions, and standards for training?” He answers his own question by concluding, “Our training must produce individuals who in the situations presented by modern military operations will rapidly construct views of reality that allow them to recognize and respond creatively to unexpected challenges. We cannot get the successful performance we need by limiting training to observed performance. We must reach to its foundations in the inner world of cognition. If we seek success in military operations, we should ensure that the human beings who are an essential and inevitable component of every operation and every military system are performing at the highest level of cognitive competence of which they are capable.”

The development of these cognitive skills early in a military career becomes increasingly important as increasingly junior officers and noncommissioned officers (NCOs) are placed in complex situations for which MDMP and templating such as is seen in the Intelligence Preparation of the Battlefield (IPB) will likely prove to be inadequate. We conclude that the development of cognitive readiness, specifically intuition skills in parallel with critical/creative thinking skills, promises to prepare leaders at all levels to adjust to the uncertainties and complexities associated with future war.

1. Intuition

We based our approach to intuition on the work of Gary Klein, especially his book *The Power of Intuition*.³⁸ In this book, Klein defines *intuition* as “the way we translate our experience into action. Our experience lets us recognize what is going on (making judgments) and how to react (making decisions). Because our experience enables us to recognize what to do, we can therefore make decisions rapidly and without conscious awareness or effort. We don’t have to deliberately think through issues in order to arrive at good decisions.”

The use of intuition to make decisions is not new. Klein reports that a study in 1989 found that Army officers used intuition in 96% of their decisions during planning. In

³⁸ Klein 2003.

1996, a study of naval commanders found that 95 percent based their decisions on intuition. What is new is the idea of learning intuition as a skill. Again, according to Klein, “It is critical that we develop intuition into a reliable instrument. That means continually challenging yourself to make tough judgments, honestly appraising those judgments to learn from the consequences, actively building up an experience base, and learning to blend intuitions with analyses.”³⁹ Later in this paper, we will discuss a range of approaches to building intuition.

The Army Field Manual on Mission Command describes intuitive decisionmaking as follows:⁴⁰

Intuition works well when acting in uncertain situations and significantly speeds up decisionmaking. Intuition in this context is the insight or immediate understanding that rapidly dismisses impractical solutions and moves to a feasible COA. This “art” comes from a combination of the commander’s experience, training, and study.... The majority of tactical decisions during execution—made in the fluid, changing conditions of war, when time is short and information is lacking or doubtful—will be intuitive... Intuition allows the commander to “read” the battlefield and do the right thing—faster, more accurately, and more decisively than the enemy. In battle, intuition includes insight into what the enemy is probably going to do and playing that propensity against him... Emphasizing experienced judgment and intuition over deliberate analysis, the intuitive approach helps commanders increase tempo and develops the flexibility to deal with the uncertainty that follows.

The major concern about the use of intuition for decisionmaking is the fear that intuition will lead to incorrect decisions. Opponents provide examples where the use of intuition has led to mistakes or incorrect decisions and argue that decisionmakers should suppress intuition in favor of deliberate analysis. Klein does not deny the role of conscious deliberation in decisionmaking and explicitly includes it in his model when he argues, “We need intuition—balanced with analysis because intuition is fallible—but we can’t use analysis to substitute for intuition.” Klein makes his most important point when he says, “Leaders know they have to rely on their own judgments and intuition in making tough decisions. However, they don’t have guidance on how to make their judgments trustworthy. They may not know that there is a science underneath skilled intuitive

³⁹ Ibid., p. 9.

⁴⁰ Department of the Army 2003, pp. 2–4.

decisionmaking and that it is trainable. That's why tools and strategies for intuitive decisionmaking are so critical.”⁴¹

This is exactly our point. Leaders use intuition all the time to make decisions but DOD does not explicitly train intuitive decisionmaking skills. If the DOD is to ensure that its leaders develop adaptability, it must take steps to facilitate learning of intuitive decisionmaking skills.

2. Critical/Creative Thinking

Intuitive decisionmaking skills alone are not enough. There are times when intuition is not sufficient. There are times when analytic skills must support our intuition. We include these analytic skills in the category of critical/creative thinking.

We have found research in both the Army and the Air Force devoted to the development of critical thinking. At a critical thinking conference sponsored by the Army Research Institute in 2000, retired Major General Lon E. Maggart argued that the payoff for developing critical thinking skills is in the way soldiers and leaders can convert brainpower into combat power. Maggart stated, “The Army is basically a process-driven organization, more interested in standardization of thought than in divergent thought. Critical thinking clearly requires divergent thought.” In the context of the conference he argued that the participants should “resist the urge to develop another military decisionmaking process or a command and staff action process. If you do so, it will be doomed by the same limitations and restrictions to productive thought from which these and other Army processes currently suffer.” According to Maggart, critical thinking includes the thinking skills of reasoning, imagination, mental flexibility, perception, innovation, vision, and creativity.⁴²

Maggart's key point was as follows:

Leaders now must deal with an entirely new set of intellectual, cultural and equipment challenges that were not present just six years ago. These challenges plus the advent of digital information systems that allow communications at rates and to places never before possible and way more data than a normal human can deal with, all require substantial changes in the skills required of leaders as well. Traditional leadership techniques and practices simply will not suffice in the months and years to come. Leaders

⁴¹ Klein 2003.

⁴² Riedel 2000.

must therefore be able to think on their feet, make rapid and accurate decisions, take the initiative, be more aware of their capabilities and adapt instantly to rapidly changing even chaotic situations using divergent thinking to process enormous amounts of information to reach an acceptable solution that will deal effectively with the circumstances.

The Air Force has also been thinking about critical thinking and, in a recent article,⁴³ Colonel Michael Guillot described critical thinking as “the most important essential skill for Strategic Leaders.” Guillot first established a definition of critical thinking by referring to an academic definition. According to Guillot, *critical thinking* is

- Disciplined, self-directed thinking that exemplifies the perfections of thinking appropriate to a specific mode or domain of thinking.
- Thinking that displays mastery of intellectual skills and abilities.
- The art of thinking about one’s thinking while thinking, to make one’s thinking better: more clear, more accurate, or more defensible.
- Thinking that is fully aware of and continually guards against the natural human tendency to self-deceive and rationalize to selfishly get what it wants.

He then argued that a more concise definition of critical thinking is “the ability to logically assess the quality of one’s thinking and the thinking of others to consistently arrive at greater understanding and achieve wise judgments.” Like Maggart, Guillot argued, “The key is to recognize that regardless of the definition, critical thinking abilities can be individually developed.”

In a recent newsletter,⁴⁴ the Army Research Institute made the following point:

Army officers are often required to operate in situations, which they may not have previously encountered and for which they haven’t been trained—for example, fighting terrorism, performing peace keeping operations, disarming an explosive device they have never seen before, or working closely with team members of other nationalities who have different ways of approaching problems. The ability to critically think through a problem, rather than only apply previously learned solutions and procedures, is crucial to Army success.

⁴³ Guillot 2004.

⁴⁴ Army Research Institute 2003.

We have added the concept of creative thinking to our model because we think it is important to spell out the need to develop individuals with the ability to think creatively. We describe both critical and creative thinking as qualities of good thinking processes. Creative thinking is involved with the creation or generation of ideas, processes, experiences, or objects; critical thinking is concerned with their evaluation. Creative thinking involves creating something new or original. It involves the skills of flexibility, originality, fluency, elaboration, brainstorming, modification, imagery, and associative thinking. Critical and creative thinking are interrelated and complementary aspects of thinking. Almost all of the thinking that we undertake contains some critical and some creative aspects. For example, when we try to solve real life problems we move back and forth between creative and critical reflection as we develop solutions or weigh the consequences of any one solution. It is important, therefore, that any attempts to improve thinking abilities pay attention to both critical and creative aspects of thinking. While critical thinking is more left-brain and creative thinking more right brain, they both involve “thinking.” In other words, in order to develop adaptability, it is important to develop both left- and right-brain thinking skills.

Another way of thinking about creative thinking is the concept of innovation. In the preface to a recent article found on the US Army Web site, the Chief of Staff of the Army, General Peter Schoomaker, made the following comments: “We are an Army at war, serving a Nation at war. To win this war and to be prepared for any other task our Nation may assign us; we must have a campaign quality Army with a joint and expeditionary mindset. A fundamental underpinning of this mindset is a culture of innovation.”⁴⁵ It is our view that the Army can only create the culture of innovation called for by the Chief of Staff of the Army and this article if the Army develops the cognitive skill of creative thinking in its members.

Our hypothesis is that training cognitive skills—the parallel development of intuition-related skills and of critical/creative thinking skills—will enhance the ability of individuals and units to adapt to the challenges of future war. Nobel Prize winner Daniel Kahneman, in his acceptance lecture in Oslo, described the relationship between these two sets of skills in 2002.⁴⁶ In this lecture, Kahneman described “two generic modes of cognitive function: an intuitive mode in which judgments and decisions are made

⁴⁵ Fastabend and Simpson 2001.

⁴⁶ Kahneman 2002.

automatically and rapidly, and a controlled mode, which is deliberate and slower.” According to Kahneman, there are four ways in which an individual can make a judgment or decision:

1. No intuitive response comes to mind, and the judgment is produced by the controlled mode, i.e., critical/creative thinking.
2. An intuitive judgment is evoked, and
 - A. is endorsed by the controlled mode; or
 - B. serves as an anchor for adjustments that respond to other features of the situation, i.e., is modified by the controlled mode; or
 - C. is identified as incompatible with a subjectively valid rule, and blocked from overt expression thus leading to a requirement for the controlled mode to solve the problem.

Kahneman states that the relative frequencies of these outcomes, from most to least frequent, is 2A – 2B – 1 – 2C. If Nobel Prize winner Kahneman, is correct, especially, when it comes to the importance of intuition, then it seems reasonable for the DOD learning environment to work to improve intuition-related skills and to develop critical/creative thinking skills.

C. Learning Relational Skills

We consider relational skills as having to do with the interaction over time between individuals in the work place. All of the services have become aware of the importance of developing relational skills of one kind or another, especially in the context of leader development. We have not been able to find a consistent approach or comprehensive theory of relational skills, so we have developed a hybrid that includes existing DOD approaches, the latest developments in the corporate world, and psychological literature. The key consideration that we have brought to this effort is the recognition that teams and teams of teams—not individuals—do the work of the Department of Defense. Individuals make up teams and must prepare for their roles in teams. Teams must learn to operate effectively themselves and with other teams. It is in this context that we think about the individual relational skills of self-awareness and the team-oriented relational skills that are social rather than task-oriented skills.

The Army Training and Leader Development Panels for both officers and NCOs identified the individual relational skill of self-awareness as one of the two metacompetencies that should be taught as part of the Army’s program for lifelong

learning.⁴⁷ The individual skill of self-awareness refers to the extent to which people are conscious of various aspects of their identities and the extent to which their self-perceptions are internally integrated and congruent with the way others perceive them. Self-awareness is a measure of the person's ability to be truly conscious of the components of the self and to observe it accurately and objectively. Self-awareness has two facets, the internal (recognizing one's own internal state) and external (recognizing one's impact on others).⁴⁸

The military services are working on 360-degree assessment programs in which seniors, peers, and subordinates provide assessments of an individual's performance in one area or another. To date they are implementing these programs in only a few locations in each service, but ultimately they can use these programs servicewide. Although all of the services have identified team skills as important, we found no evidence that any have specifically identified the relational or social aspects of team skills as something that needs to be developed. Nevertheless, many of the leadership skills taught by the services include elements of this form of team skills that we also call social skills. In addition, the Air Force is using assessments of self-awareness and social skills to screen recruiters.⁴⁹

The practice of self-awareness enables us to examine ourselves through the lens of "a realistic assessment of our own abilities and a well-grounded sense of self."⁵⁰ In essence, self-awareness frees us to become the person we would like to be if we are committed and disciplined enough to do the work to get to this idealized place. Conversely, a lack of self-awareness results in individuals who view themselves and the circumstances of their environment as elements beyond their control. They are satisfied with the notion that the opinions, judgments, and interpretations of the people around them define who they are and what they can become. This unfortunate perspective is detrimental on many fronts, not the least of which is how this view significantly limits our personal potential and our ability to relate to others.

Although self-awareness focuses on understanding who we are on the inside, its value to an organization manifests itself on the outside, through an individual's ability to

⁴⁷ The other metacompetency was adaptability.

⁴⁸ Hall 2004, p. 154.

⁴⁹ US General Accounting Office 1998.

⁵⁰ Goleman 1998, p. 318.

operate effectively in the workplace as a result of their attitudes, behaviors, and perceptions of themselves as well as how others perceive them. Unfortunately, many people who hear the term self-awareness mistakenly think this is an area best left to practitioners of yoga, meditation, and deep thought. This is an unfortunate misunderstanding. In reality, self-awareness means “having a deep understanding of one’s emotions, strengths, weaknesses, needs, and drives. People with strong self-awareness are neither overly critical nor unrealistically hopeful. Rather, they are honest—with themselves and with others.⁵¹ Individuals who possess a high degree of self-awareness are cognizant of how their feelings *affect* not only themselves, but also the people around them. The more self-aware an individual, the clearer they are about their motivations, expectations of others, and the more *flexible* they are in adjusting to new circumstances. Essentially, self-awareness contributes to an authenticity of character that enables an individual to play to his or her strengths while remaining cognizant of his or her weaknesses. This practice in-effect greatly reduces or eliminates the proverbial *blind spots* that are so detrimental to the leader-follower relationship and facilitates the creation of effective work environments.

Team skills include those social skills necessary for team members to operate effectively as a group. According to Goleman:

Humans are the primordial team players: Our uniquely complex social relationships have been a crucial survival advantage. Our extraordinary sophisticated talent for cooperation culminates in the modern organization.

Operating in a coordinated band—whether it be a working corporate team or a roving group of protohumans—demands a high level of social intelligence, skill in reading and handling relationships.

When teams operate at their best, the results can be more than simply additive—they can be *multiplicative*, with the best talents of one person catalyzing the best of another and another, to produce results far beyond what any one person might have done. The explanation of this aspect of team performance lies in the members’ *relationships*—in the chemistry between members.⁵²

⁵¹ Ibid., p. 97.

⁵² Goleman 1998, p. 199.

According to the Consortium for Research on Emotional Intelligence in Organizations,⁵³ the following skills allow groups to work together effectively:

Social Awareness:

- Empathy—understanding others and taking active interest in their concern
- Service orientation—recognizing and meeting customer's needs
- Organizational awareness—perceives political relationships within the organization

Relationship Management:

- Inspirational Leadership—inspiring and guiding groups and people
- Developing Others—helping others improve performance
- Change catalyst—initiating or managing change
- Conflict management—resolving disagreements
- Influence—getting others to agree with you
- Teamwork and Collaboration—building relationships with a creating a shared vision and synergy

Although we have categorized relational skills into two subcategories, individual and team skills, this is not the only taxonomy that can be applied to these skills. The concept of emotional intelligence (EI) provides another approach to these critical skills. A recent article by Latour and Hosmer⁵⁴ in the *Air and Space Power Journal* categorizes the elements of emotional intelligence into five domains under two overarching relational areas:

Intrapersonal skills (skills that we fit into the category of individual skills)

- *Self-Awareness* involves purposeful monitoring of one's emotional reactions to identify feelings as they emerge.
- *Managing Emotions* builds on the understanding of emotional origins derived from self-awareness to manage feelings appropriately as they arise.
- *Motivating Oneself* requires individuals to channel emotions effectively. Examples could include stifling impulses and delaying gratifications.

⁵³ Consortium for Research on Emotional Intelligence in Organizations, <http://www.eiconsortium.org>.

⁵⁴ Latour and Hosmer 2002.

Interpersonal skills (skills that we fit into the category of team skills)

- Empathy involves the degree that individuals are sensitive to others' feelings and concerns. Empathetic leaders are sensitive to the differences in how people feel about things. Such leaders are able to step outside themselves to evaluate situations from another perspective.
- *Handling Relationships* describes how effectively leaders detect and manage the organization's emotional environment. This requires developing a wide-ranging competence for sensing subtle shifts in the social atmosphere.

In essence, we have incorporated the Latour and Hosmer taxonomy into our two categories of individual and team relational skills. In another approach to the concept of team skills, the leading researcher on emotional intelligence, Daniel Goleman, has concluded that possession of these relational skills is an indicator of effectiveness at higher leadership levels. According to Goleman:⁵⁵

Emotional intelligence played an increasingly important role at the highest levels of the company, where differences in technical skills are of negligible importance. In other words, the higher the rank of a person considered to be a star performer, the more emotional intelligence capabilities showed up as the reason for his or her effectiveness. When I compared star performers with average ones in senior leadership positions, nearly 90% of the difference in their profiles was attributable to emotional intelligence factors rather than cognitive abilities. Other researchers have confirmed that emotional intelligence not only distinguishes outstanding leaders but can also be linked to strong performance.

Goleman argues that individuals can learn emotional intelligence,

Emotional Intelligence is born largely in the neurotransmitters of the brain's limbic system, which governs feelings, impulses, and drives. Research indicates the limbic system learns best through motivation, extended practice, and feedback. . . . The neocortex [which governs analytical and technical ability] grasps concepts and logic. It is the part of the brain that figures out how to use a computer or make sales calls by reading a book. Not surprisingly- but mistakenly- it is also the part of the brain targeted by most training programs aimed at enhancing emotional intelligence. When such programs take, in effect, a neocortical approach . . . they can even have a negative impact on people's job performance. . . . To enhance emotional intelligence, organizations must refocus their training to include the limbic system. They must help people break old behavioral habits and establish new ones. That not only takes much more time than

⁵⁵ Goleman.

conventional training programs, it also requires an individualized approach.”

According to Latour and Hosmer, the Air Force has recognized the importance of developing these skills in Air Force Instruction (AFI) 36-3401, Air Force Mentoring, which incorporates EI principles by providing guidance for the full spectrum of Air Force leadership skills. It underscores the pivotal role of the supervisor in developing his or her subordinates in both technical and professional/personal arenas by highlighting the need to establish personal relationships with them. The AFI urges Air Force leaders to use mentoring as one of the key relational tools for building EI skills and awareness in both themselves and their subordinates.⁵⁶

The Army recognized the importance of self-awareness in the Army Training and Leader Development Panel (ATLDP) and has begun a number of efforts to develop self-awareness skills throughout the Army. For example, the Army Special Warfare School has incorporated a special course on self-awareness and adaptability into its basic program. In addition, the Army has established a program for conducting 360-degree evaluations for units attending a Combat Training Center and is working on developing an Army-wide 360-degree evaluation program. The Army designed these programs to enhance individual self-awareness by virtue of a personal and private assessment of Army leaders that subordinates, peers, and seniors will provide the leaders.

Similarly, the Navy has recently studied the 360-degree evaluation program. In October 2004, the Navy began testing the concept on a limited basis. Currently in its second phase, the testing has expanded to 450 officers on 15 ships and 3 shore commands. The Navy is considering the concept for use in a new performance evaluation system. Some flag officers and some specialized units, including SEALs and the Blue Angels, are already using the concept. The Navy Inspector General, in a December 2004 report, recommended use of the system as an antidote to the large number of unscheduled reliefs of commanding officers in the past 5 years.⁵⁷

⁵⁶ Latour and Hosmer 2002.

⁵⁷ Faram 2005.

VII. MODIFYING THE DOD LEARNING SYSTEM TO ENHANCE ADAPTABILITY

Based on our analysis of the adaptability-learning model, we have identified four suggested adaptability-learning goals for the department as a whole. Given the new era of future war and asymmetric threats, the primary goals should be to create adaptability in those elements of the force that must be prepared to deal with future war. In our view, this is the entire DOD. Clearly, this is true for the entire Army and Marine Corps. However, the Navy and Air Force must also expect to face asymmetric threats. Surely littoral operations involve asymmetric threats that the Navy must prepare for. And the Air Force cannot expect a 4th generation enemy to present the kind of target set that it expected to see in 3GW. In addition, as Hammes argues, we should expect the Chinese to make use of a wide network of alliances and 4GW techniques to neutralize the power of the United States. Hammes quotes Chinese authors who have written of “using all means—military and nonmilitary—to prevail in a war with the United States.” These means include such diverse tactics as “employing computer hackers to attack military and government systems, an increased emphasis on urban guerrilla warfare, and the use of financial terrorism.”⁵⁸

A. Adaptability Learning Goals

1. Create adaptable individuals, commander/leader teams (CLTs), and units/organizations more capable of operating in the new era of asymmetric threats.
2. Develop adaptability-learning opportunities for individuals, CLTs, and units/organizations.
3. Integrate adaptability training into the existing training system.

In the course of this study we recognized that it was insufficient to speak of adaptability only in terms of individuals and units. Thanks to the work of LTG (Ret.) Frederick “Rick” Brown, we recognized that there was one element of the department for which learning adaptability was especially critical. That element is the entire spectrum of CLTs on whom the department depends to accomplish its many missions. We discuss CLTs in the next section.

⁵⁸ Hammes 2004, p. 257.

The next two goals have to do with the “how” of adaptability learning. The first of these is to identify specific adaptability learning tools that individuals, CLTs, and units/organizations can use. We are working to identify a number of potential tools. Recognizing the constraints of time, we also are working on identifying ways that existing training programs can include adaptability training. Our focus with regard to both of these goals is on tools that are consistent with Training Transformation.

These proposed goals are not entirely new. The Army War College describes a similar set of goals in an introductory paper for AWC students. “We want students to begin to think critically and creatively about strategic-level challenges using multiple perspectives. Learning is a process of adapting. Our intent is to help the student become a more self-motivated learner; hence, a more adaptive leader through increased self-awareness, organizational awareness, and environmental awareness. We want our students to be able to challenge personal and organizational assumptions, beliefs, and values to determine their relevancy for the future.”⁵⁹

B. Commander Leader Teams

In the process of developing the concepts of adaptability we began to focus on the question, Who needs to learn to be adaptable? The first answer, of course, is individuals. The second answer is units, since the work of the department is done not by individuals but by units. In arriving at these answers we recognized that we had left out one element. That element was the group of individuals who make up what is commonly called *the chain of command*, i.e., the group of leaders and staff whose ability to adapt is the most important element of a unit’s ability to adapt. This recognition led us to the concept of commander/leader teams. In a number of IDA studies, General Brown has developed the theories and concepts of CLTs on which we rely for this study.⁶⁰ General Brown has identified the following three types of CLTs:

- Chain of command – vertical (hierarchical)
 - Traditional chain of command across multiple echelons
 - Unity of effort and unity of command
- Chain of coordination – horizontal (peer)

⁵⁹ Paparone 2003.

⁶⁰ Brown 2000, 2002, and 2005.

- Independent organizations working to a common goal
- Unity of effort but not command
- Chain of functional support – vertical and horizontal
 - Functional support teams based on shared functional responsibilities, e.g., fires, logistics, intelligence
 - Supported and supporting CLTs working together

These CLTs operate at every level in the services and in the joint, interagency, and multinational (JIM) arenas. The central premise of Brown's CLT concept is that if leaders act as teammates between levels and across echelons then organizational performance improves. Units and organizations with teams of commanders and leaders that habitually critique and review their actions and make deliberate corrections do better than those that don't.

The concept of commander/leader teams is not necessarily new nor is the concept of training them new. The services have long had command post exercises (CPX), for example. Training of CLTs is least developed in the joint, interagency, and multinational areas where teams are often too busy with day-to-day activities to train, e.g., COCOM staffs, or are put together on the fly, e.g., joint, interagency, and multinational task forces. Given the focus of Training Transformation (T2) on this level of training, we have focused our efforts on ways that T2 might enhance the adaptability of CLTs at the joint, interagency, and multinational level.

One way to think of this problem is to use the concept of the art of command and the science of control that the Army describes in FM 6.0, Mission Command. In general, fixed rules and processes associated with the Military Decisionmaking Process and institutionalized in most current DOD training, to include the training supported by the Joint National Training Capability, form the basis for the science of control. Existing staff training systems appear to create planning and decisionmaking bodies that are experts in the science of control and are capable of great bureaucratic efficiencies. Today's staffs, especially at the operational and strategic levels, have learned the complex details of the joint planning system very well. They have learned the processes of making matrices, tables, and templates that assist the commander in working his way through the creation of alternative courses of action. Today's staffs are even better at proliferating decisions downward and propagating the commander's plan into painfully elaborate annexes and compendiums to be followed precisely by subordinate units. We

see no relationship between this kind of “command by plan” and the concept of adaptability we have identified.

The American success story in creating the first truly integrated and joint staff planning system is a success story in terms of the science of control. The challenge facing the DOD today is to develop CLTs that are skilled in the art of command. The war in Iraq has reinforced a concern that the linear joint planning system is not suitable for fighting an enemy whose method of war does not mirror our own. This enemy fights without a staff planning system. His strength lies in the spontaneity and adaptability of his method of command and control. The US military must create CLTs that are as adaptable, and preferably more so, than those of the enemy. CLTs must become thinking adaptive organisms capable of providing the commander with wisdom, counsel and a sense of “ground truth” that no mechanical planning system like the MDMP will ever be able to match.

Preparation of artists of command is highly subjective and is not a focus of existing training systems. According to FM 6.0, “A major part of the art of command is knowing when to change the plan and determining the right changes to assure success. Critical to command is determining what criteria indicate needed changes and deciding which changes will obtain the maximum contribution to achieving the higher commander’s intent.” This is precisely what Klein talks about in his study of adaptive teams (Klein, 2001). In other words, adaptable CLTs are CLTs that are expert in the art of command. Since the current training system seems to focus on training the science of control, the challenge is to identify ways to teach the art of command.

C. Proposed Changes to Enhance the DOD Learning System

The existing DOD learning system, embodied in DOD educational and training establishments, has been central to creating a US military that is without peer around the world. It is with great trepidation that we suggest changes. Our basic concept is to rely on the better mousetrap theory. If learning adaptability is as important as we think it is, then the best role for T2 is to provide adaptability learning tools and, if they are useful, the DOD learning establishment will begin to use them. If this is to be possible, the first challenge is to break the adaptability-learning problem into manageable components. We base our concept on the assumption that the DOD learning system will provide different learning opportunities to individuals, commander/leader teams, and units or organizations. Our approach breaks each of these categories into subelements based

either on size of unit or on stage of career—from entry through senior level for individuals and from small through large units and organizations (including joint, interagency, and multinational) for CLTs and units. Figure 3 provides a graphic example of our concept.

Fundamental to our concept is the assumption that a large proportion of existing training and education will continue but will incorporate adaptability-learning initiatives. As we will describe below, this kind of training already exists in many places in the DOD. Our second assumption is that DOD will find time to insert new learning modules into the existing system. We describe the nature of these changes and insertions below.

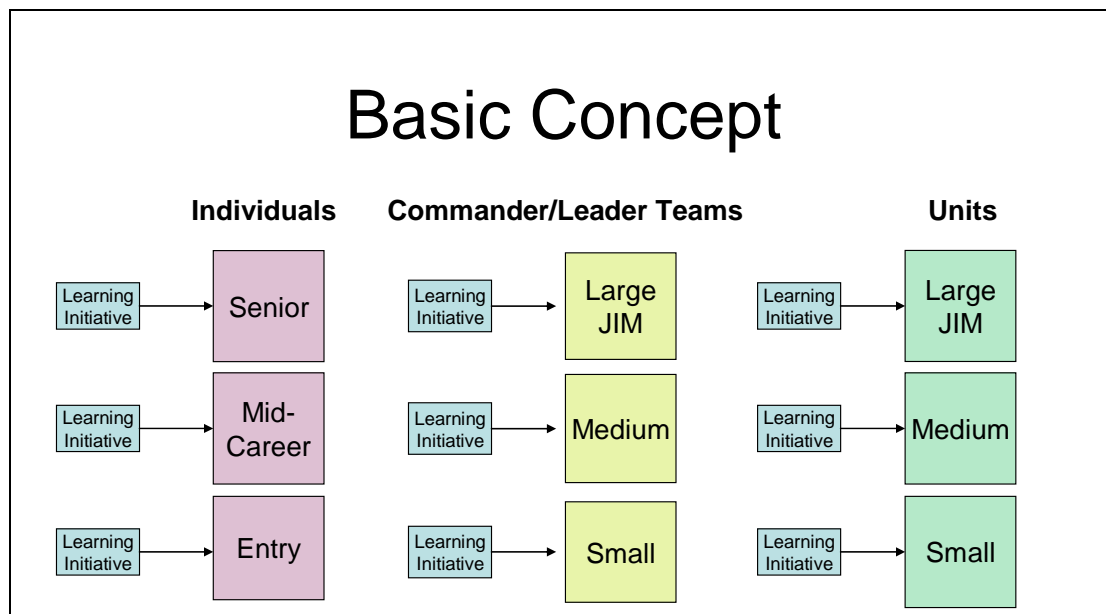


Figure 3. Insert Adaptability Learning Initiatives into Existing Programs

Perhaps the greatest obstacle to our concept of inserting adaptability-learning opportunities into the existing learning environment will be the claim that the time for training and education is already oversubscribed and that there is simply no way to add additional learning events. Although we recognize that the time available for commitment to learning appears to be fully subscribed, we believe that the recognition of the importance of adaptability will lead to decisions to include adaptability-learning opportunities in existing training or to conclusions that some current learning events are less important than learning adaptability. This is the decision the Army Special Warfare School made when it recently inserted a short course on adaptability into its existing program, for example. It is what the Georgetown University ROTC did with virtually the

entire curriculum when the staff concluded that the prescribed curriculum was inadequate to prepare cadets to be successful officers in the new environment. Perhaps, more importantly, it is what "passionate professionals" do to capitalize on their innate desire to improve - when they sense professional value. Although these are small samples, existing statements from senior DOD leaders seem to suggest that similar decisions would be likely if the managers of the learning environment learned of the existence of positive results associated with new approaches to learning adaptability.

The concepts associated with learning programs for CLTs include new learning initiatives as well as changes in existing training practices. For example, an AAR that focuses on a critique of the performance of a task to standard does not provide much adaptability-related learning. On the other hand, an AAR that addresses the cognitive or the relational processes at work in an exercise can contribute directly to building adaptability skills.

1. Enhancing Intuition

History teaches that great combat commanders have one trait in common. They possess an intuitive sense of the battlefield. While the intuition of the great commanders may be largely innate or based on long experience, our research on intuition has led us to conclude that this intuitive sense of the battlefield can be learned so that individuals across DOD can use improved intuition to make better decisions. This conclusion about the ability to learn intuition and the discovery that use of intuition can significantly improve decisionmaking is relatively new. It was only a few years ago that the use of intuition was seen as an obstacle to good decisionmaking. Psychologists argued that intuition was unreliable and only an analytic decisionmaking process was acceptable. Recent research has demonstrated that in fact the use of intuition can significantly improve decisionmaking, especially in a fluid, complex, competitive environment.⁶¹ Other research has demonstrated ways that individuals can learn intuition.

Gary Klein and his associates have done extensive work for the Army and Marine Corps on developing ways to teach the use of intuition in decisionmaking. According to Klein, the key aspect of using intuition in decisionmaking is in recognizing patterns and comparing the new pattern with a pattern with which the decisionmaker is already

⁶¹ All of the intuition-related research noted in this paper is based on these findings. Another specific report on this issue can be found in Johnston, Driskell, and Salas 1997, pp. 614–622.

familiar. Firefighters recognize patterns in fires, nurses recognize patterns in patients, and soldiers recognize patterns in combat situations.⁶²

Once we recognize a pattern, we gain a sense of a situation. We know what cues are going to be important and need to be monitored. We know what types of goals we should be able to accomplish. We have a sense of what to expect next. And the patterns include routines for responding—action scripts. If we see a situation as typical then we can recognize the typical ways to react. That's how we have hunches about what is really going on, and about what we should do about it.

The more patterns and action scripts we have available, the more expertise we have, and the easier it is to make decisions. The patterns tell us what to do and the action scripts tell us how. Without a repertoire of patterns and action scripts, we would have to painstakingly think out every situation from scratch.

This ability to recognize patterns comes with experience. As a result, senior officers with lots of relevant experience have lots of intuition. Junior officers with little experience have little intuition. The type of experience is also important. Just as a firefighter's experience would not be of much value in fighting a war, an officer with lots of experience in 3GW may not find that experience to be of much value in fighting future wars.⁶³ The goal for learning intuition would be to provide individuals with simulated experience that would build the kind of patterns that would be useful in a wide range of unpredictable missions. Service members who fought in the initial stages of the Iraqi war had training and intuition that served them well in the initial phases of the war but were unprepared for the aftermath of initial conventional combat operations. The goal for an intuition-learning program would be to build intuition that would cover a much greater range of missions.

To build the ability for making intuitive decisions, the decisionmaker must practice the basic elements of intuitive decisionmaking shown above. According to Klein, the centerpiece of a mental conditioning program to develop intuition is a decisionmaking exercise (DMX) that captures the essence of a difficult decision, allows the student to practice making decisions, and provides feedback on the experience itself.

⁶² Klein 2003, p. 23.

⁶³ Reports from Leonard Wong of junior officers conducting stability operations in Iraq with little or no guidance from their seniors may be evidence of this problem.

These DMXs can be a simple paper exercise in a classroom or in the field. They can be computer-based and distributed across the internet.

There are many places within DOD where DMXs (also known as Tactical Decision Games) are used to build intuition. The Marines use DMXs extensively and even publish paper versions in the Marine Corps Gazette.⁶⁴ We discovered DMXs in use at the Georgetown University ROTC, where they are used explicitly to build intuition in inexperienced cadets. It is important to recognize that most training exercises are designed to teach tactics, techniques, and procedures (TTP) rather than to build an experiential base of decisionmaking. It is also important to note that the nature of the feedback process needs to be different from an After Action Review that focuses on performance. In the context of a DMX designed to develop intuition, the feedback should not be on whether the decision was good or bad. Instead, the feedback should focus on understanding the decision process, i.e., why and how the decision was made.⁶⁵

Klein lists a number of barriers to intuitive decisionmaking that include lack of experience, organizational policies, rapid turnover, training to fixed procedures, and a culture that discourages initiative. Lack of experience is certainly a problem for junior officers, especially when promotion times are short and officers are unable to obtain the full range of experiences they normally would get at the lower ranks. Organizational policies, especially those that count paper credentials more than experience, lead to having decisionmakers without the experience that can provide the basis for intuitive decisionmaking. Rapid turnover reduces the level of experience for both individuals and units. Training to fixed procedures and metrics forces service members into narrow tracks that prevent them from seeing the complexities of the environment and of the decisions they must make. Finally, a culture that discourages initiative leads to the development of service members who are content to employ predetermined procedures even though those procedures may be demonstrably inadequate to the situation.⁶⁶

The capabilities inherent in the Joint National Training Capability and the Joint Knowledge Development and Distribution Capability suggest that these two Training Transformation efforts could contribute to the development of intuition learning

⁶⁴ John Schmitt, quoted at length above, can be considered the father of the use of DMXs in the Marine Corps.

⁶⁵ Klein, 2003, p 57.

⁶⁶ Klein 2003, p. 33.

opportunities across the department. Given JKDDCs' ability to provide distance-learning opportunities and JNTCs' ability to support large-scale, distributed exercises, it seems reasonable to assume that they could also provide support to efforts to build intuition in individuals and CLTs. JKDDC might, for example, build on the efforts by ARI to build a computer-based training program to train commanders how to "Think Like A Commander" as well as on the efforts by the Army to develop the Battle Command Knowledge System, which envisions the ability to distribute DMXs across the entire Army. Similar to the way it supports joint exercises, JNTC might provide DMXs for individuals and CLTs and might use centrally located mentors to provide the AAR feedback that is central to learning to use intuitive skills in decisionmaking. Klein's organization has demonstrated such a possibility in a project it did for the Army.

2. Enhancing Critical and Creative Thinking

Just as individuals can learn the cognitive skill of intuition, we believe that they can learn the cognitive skills of critical and creative thinking. The Army Research Institute has been developing techniques for teaching critical thinking skills in the classroom. According to ARI:⁶⁷

Critical thinking skills are a set of cognitive skills that are developed over time given the appropriate educational experiences and practice. Our training approach is based on the theory that everyone can develop critical thinking skills given appropriate educational experiences and practice. As with any skill-acquisition training, students must be given an explanation of the skill and how it is used, an opportunity to practice the skill, and immediate feedback about their performance of the skill.

Our approach to schoolhouse implementation of CTS training seeks to integrate the skills into lesson plans in such a way that they are practiced and evaluated in the course of a seminar discussion or a practical exercise. These skills are explicitly listed in the lesson plans, but ideally they are integrated seamlessly into the conduct of regular classroom instruction. A history lesson may compel students to adopt multiple perspectives. A tactical planning exercise may compel students to visualize plans to see if they accomplish an objective. A leadership lesson may compel students to challenge their own biases. If a student identifies the skill and wants to discuss it, that is encouraged. However, the skill will not normally be explicitly acknowledged by the instructor in the course of the instruction.

⁶⁷ Army Research Institute 2003.

The instructor also provides a model of how to execute critical thinking in his own approach to the exercises.

The Army has already integrated training in critical thinking into its curricula at the Command and General Staff College and the Advanced Officer's Warfighting Course. ARI has identified the possibility of integrating this kind of skill training earlier into an officer's career such as cadet training and the captain's career course. In addition, ARI has developed a web-based critical thinking program for distance learning.

Our research suggests that Decision Making Exercises that simulate an actual experience are the best way to teach both intuition and critical thinking. The student learns when to use intuition to solve a DMX problem and when to use critical thinking. The student practices both techniques and receives feedback. The practice using intuition or critical thinking as part of the DMX adds to the student's ability to perform these cognitive skills. The simulated experience provides patterns that may one day in the future allow the student to make an intuitive decision based on pattern recognition.

Intuition and critical thinking are not enough. In an activity like problem solving, creative thinking is also important. If intuition does not provide an immediate solution, we must analyze the problem; then we must generate possible solutions; next, we must choose and implement the best solution; and finally, we must evaluate the effectiveness of the solution. This process reveals an alternation between the two kinds of thinking—critical and creative. In practice, both kinds of thinking operate together much of the time and are not independent. Therefore, training for creative thinking must be done in parallel with critical thinking. Fortunately, the techniques for training creative thinking are essentially the same as for training critical thinking and intuition. The DMX provides the basic learning tool for all three types of thinking.

Just as JNTC and JKDDC have the potential to support intuition-learning efforts, they have the potential to support learning efforts for critical and creative thinking skills.

3. Enhancing Individual Relational Skills

Developing individual relational skills is primarily associated with the concepts of individual self-awareness and self-development. The Army Training and Leader Development Panel identified self-awareness as an enduring competency that all Army officers should possess. According to the ATLDP, individuals develop self-awareness through a process of self-development enhanced by feedback provided by AARs, mentors, and 360-assessments. The Army is well on its way to developing the elements

of this process and is planning on using the internet, specifically Army Knowledge Online (AKO) and the Battle Command Knowledge System (BCKS), to provide the resources needed to support the self-development process. The other services are also beginning to develop some of the tools to enhance individual relational skills as well as to enhance technical skills. These self-development programs are within a particular military service. They are being developed unilaterally and may have little cross service utility. It may prove to be more effective if T2 would undertake to provide some of these self-development programs that are not service specific. Individual relational skills such as self-awareness are not service unique. It appears that JKDDC could provide this type of self-development program throughout DOD.

4. Enhancing Team Relational Skills

Training for team social skills can be inserted into many of the team training tools in use today. In essence, they can be conducted simultaneously with other team training. The key to training these skills is first to recognize what they are and that they can be trained. The next step is to incorporate these skills into routine training activities or to make use of new team training tools.

Our search for tools to train team relational skills led us to another IDA product—a simulation that IDA developed at the request of the Combatant Commander of the European Command, General Wesley Clark. IDA designed this training tool, called Synthetic Environments for National Security Estimates, or S.E.N.S.E., to provide an environment in which senior leaders could gain insights on the complex crisis planning operations that characterized the new national security challenges facing the United States following the end of the Cold War. S.E.N.S.E. was designed to leverage human interaction with computer modeling to provide insights on how leaders and leader teams might combine diplomacy, economic leverage, human rights initiatives, and military power in innovative ways on battlefields that increasingly would be characterized by nonlinearity and asymmetric threats. Since its inception, S.E.N.S.E. has evolved into a more widely applicable learning tool suitable for desktop distributed interactive simulations that simultaneously address economic, social, political, and military issues. It also has the potential to serve as a learning vehicle for team relational skills. Appendix A describes in detail how S.E.N.S.E. can facilitate adaptability learning in a number of potential venues. Just as JNTC distributes large-scale staff training and mission rehearsal exercises, JNTC could distribute S.E.N.S.E. training.

The Army is developing the Battle Command Knowledge System to facilitate sharing of knowledge and as a collaborative tool for teams of all kinds both within the Army and in the area of JIM. BCKS has the potential to serve as a learning vehicle for team relational skills. Appendix B describes the potential for BCKS in greater detail. JKDDC could do the same thing in the joint environment.

D. Potential Training Initiatives

To date in this study we have identified a number of training initiatives that appear to have the potential to enhance adaptability learning throughout the Department of Defense. While many of these initiatives might also be appropriate for service learning environments, all appear to be appropriate for Training Transformation, whose implementation plan calls for T2 to “prepare the force to learn, improvise, and adapt to constantly changing threats.” We based these recommendations on our concept of T2 as a source of learning tools that DOD trainers and educators can use at their discretion to meet their needs. In our view, T2 ought to recognize the innovative work that the services and others within and outside the DOD are doing and should collect and provide those innovative training tools to potential users throughout the department. In this context, we see this study as a first step in identifying the innovative training tools under development throughout the department that T2 could provide throughout DOD.

Briefly, then, we have concluded the following regarding learning tools that could be incorporated into the DOD learning environment in the context of Training Transformation:

1. Develop S.E.N.S.E. into a learning tool for use in educational institutions and for training CLTs. Incorporate S.E.N.S.E. into JNTC. See Appendix A.
2. Expand the concept of the BCKS collaborative environment to the entire DOD to facilitate the sharing of knowledge and the development of adaptability-related skills, and to provide CLT development programs. Expand JKDDC to incorporate this concept. See Appendix B.
3. Expand the use of decisionmaking exercises across the tactical, operational, and strategic realms and use them to develop adaptability-related skills. Incorporate DMXs into educational and training environments. Ensure that the AAR process employed is designed to enhance adaptability learning. Use both JKDDC and JNTC to provide DMXs.
4. Develop (or expand) within JNTC a robust Red Teaming structure with both online and mobile training teams capable of supporting CLT DMXs in the live

training environment. The Red Team support structure should be capable of simultaneously providing adaptable, capabilities-based adversaries to multiple DMXs at the strategic, operational, and tactical levels. The JNTC Red Team should be capable of routinely supporting Service Red Teaming efforts and of providing Red Team training to units temporarily role-playing the adversary. See Appendix C.

5. Use JKDDC to provide self-development programs that will allow individuals to enhance their cognitive and relational skills.
6. Use JKDDC to provide a DOD-wide tool for conducting 360 assessments.
7. Enhance the JNTC concept of large-scale exercises to include more operational and strategic considerations and to facilitate learning adaptability.
8. Conduct an experiment or demonstration program to investigate the potential for adaptability learning efforts to enhance the ability of units to perform their basic functions in the context of the changing environment. See Appendix D.

VIII. ADDITIONAL LEARNING INITIATIVES

As the IDA study was beginning, Dan Gardner, the director of the Office of Readiness and Training, asked the project leader to be mindful of the “next steps in the training revolution.” Arguably, the next two initiatives do not relate directly to the question of learning to respond to asymmetric threats. Nevertheless, they do seem to have considerable potential to add to the next steps in the training revolution.

A. Training CLTs

As described above, building adaptable commander/leader teams may be the most important part of an effort to build adaptability into the force. Training CLTs to be adaptable requires teaching CLTs the art of command rather than the science of control. The literature on training adaptable teams is sparse, and we have based our findings on the work of three individuals or groups. The first of these is LTG Frederic (Rick) Brown, who has been doing CLT-related research for DOD for several years. The second is the work of Klein Associates, a research firm doing work for the Army, Navy, and Marine Corps. The third is an IDA report on training support for the unified commands.⁶⁸

LTG Brown has developed the concept of CLTs and has argued that unit performance might improve by more than 30 percent if the leader teams were better

⁶⁸ Worley, Vernon, and Downes 1996.

prepared.⁶⁹ According to Brown, “Creating and sustaining highly proficient leader teams (command or staff) is not addressed in current Army learning doctrine, other than during mission rehearsal exercises. Creating highly proficient vertical leader teams that function effectively and efficiently is an important and powerful force multiplier.” This concept of training CLTs in the art of command is especially important for joint, interagency, and multinational CLTs that frequently have little or no opportunity to train in advance of an operation. The concept of BCKS (Appendix B) is closely linked to Brown’s concept of training CLTs in the art of command.

Gary Klein and his associates have conducted research on team decisionmaking and on team adaptability. Klein defines *adaptive teams* as teams that are able to make the necessary modifications in order to meet new challenges. Adaptive teams in this context have a plan that they are in the process of implementing and are able to change the plan, the team, or the resource allocations in order to meet the demands of a new situation or a changed environment. Klein identifies a number of training interventions that could improve a team’s ability to adapt, e.g., developing problem-solving routines, training to manage more degrees of freedom, developing an “adaptation mindset,” training communications workarounds, training information-seeking skills, and training to rapidly “parse” a task.

Klein also identifies a number of approaches for helping teams learn to be adaptable. In general, these approaches involve providing information on adaptability skills, placing the CLT in a simulation that will give team members an opportunity to practice these skills, and providing feedback on the performance of the skills. In essence, Klein is calling for placing teams in situations where they will have to make decisions under pressure and for providing them feedback, not on whether they made the correct decision, but on the quality of their decisionmaking process and on how they might make better decisions. All the elements of adaptability learning can be incorporated in this form of learning event. The JNTC exercise program could provide this type of learning event.

An earlier IDA study reviewed ongoing joint training, where joint commands constitute the training audience, and component interoperability training, where interoperating service commands are the training audience. In the context of the present study, we can say that the earlier IDA study investigated CLT training at the large, JIM levels. That study identified five significantly different categories of training events:

⁶⁹ Brown 2002.

- The *plan execution exercise* conducted in the tactical time frame with several command echelons but without troops
- The *plan execution exercise* conducted in discrete time steps spanning weeks or months with only a single command echelon and without troops
- The *plan execution exercise* conducted in the field or at sea with troops
- The *plan development exercise* conducted in the strategic time frame with a single or partial command echelon
- The *plan development exercise* emphasizing JTF formation and time-sensitive planning

The study found the first of these types to be the dominant exercise form. This dominant form of exercise is generally conducted in real time in the tactical time frame. This exercise is excellent in large-scale integration of command and staff echelons and in training staff procedures and TTP. It does not challenge the senior leadership in the operational and strategic time frames. Because of its focus on the tactical time frame, the typical exercise does not train such areas as crisis response, JTF formation, task organization, or mobilization and deployment. Because of its real-time nature, the typical exercise does not train well those things that take a longer time to have an effect such as logistics, information operations, and political-military operations. The study concludes: “An over-reliance on training in the tactical time frame has as its consequence a training shortfall at the strategic and operational levels of war—the domain of the joint commands.”⁷⁰

The IDA study had these recommendations:

- Exercise in the strategic time frame.
- Exercise to develop the commander and staff team and to develop strategic theater vision.
- Exercise to build geographic and functional command teams.
- Build tools for small staffs and quick response.
- Exercise the planning process—train the planner.
- Exercise crisis termination with joint and interagency audiences.
- Ensure adequate emphasis on information operations and military operations other than war.

⁷⁰ Worley 1996, p. ES-5.

While this study did not focus on learning adaptability, we cite it here to point out many of the aspects of large-scale exercises that are more appropriate for training for major power/3GW than for future war. In essence, the earlier IDA study recommendations, if implemented, would go a long way toward building CLTs that are more adaptable. The JNTC exercise program. could incorporate these recommendations.

B. Learning in Units

All of the services have acknowledged the need for continuous or lifelong learning. In line with this view, we believe that DOD must afford its personnel every opportunity to understand, enhance, and apply the adult learning and thinking skills essential to the adaptability needed to succeed in an ever-changing, knowledge-based world. Given that most individuals spend the majority of their careers in units or organizations of some kind, we conclude that the DOD learning establishment should provide enhanced opportunities for learning in military units and DOD organizations of all types.

Although institutionally delivered education and formal professional development programs remain critical enablers of the learning process, adult learning theory reminds us that adults excel in environments where learning is self-directed and where they can see first-hand the need for such learning, such as in their own workplace.⁷¹ The Air Force has implicitly recognized the problem in its force development doctrine where it asserts, “In today’s expeditionary Air Force and high tempo world, the opportunities to train or receive education have become more limited. Education and training must be responsive to this shift.”⁷²

In our search for approaches for learning adaptability, we recognized that the current model of the military education process must expand to accommodate the needs of both learners and the institution. Since the time available to unit members and unit commanders is limited, we conclude that DOD should find ways for educational institutions to deliver adaptability and other learning opportunities to units and individuals in units.

Deliberately incorporating learning opportunities into the day-to-day operations of the team is consistent with the team learning orientation described above. This form of

⁷¹ Raymond 2002.

⁷² AFDD 1-1, 2004, p. 27.

learning has the potential to have a dramatic influence in the development of cognitive and relational skills that are essential to maturing team members to their fullest potential. In addition, and perhaps most compelling, is the realization that learning is going to occur everyday in a unit anyway. The question then is: Do we want to help shape and reinforce what team members are learning in the very place where they will spend the majority of their careers?

Training Transformation appears to offer the opportunity to deliver adaptability-learning opportunities to units as well as individuals in units. JKDDC and JNTC have the potential to configure themselves to deliver training opportunities such as the DMXs and S.E.N.S.E. described above. In addition to courseware, JKDDC could deliver interactive assessment tools, e.g., 360 assessments, which will facilitate the development of adaptable teams. None of these tools would be mandatory, of course, but unit commanders, who have neither the time nor the expertise to develop these tools, will be able to pick from among a menu of tools that will allow them to enhance their unit's capability in areas of their choosing. As these commanders increasingly recognize the importance of learning adaptability skills for success in a future war world, they are likely to make increasing use of these tools.

While the services are responsible for most unit training, there is a potential role for T2 to deliver learning opportunities that are not tied to a unit's specific mission. Adaptability learning opportunities generally fit into this category. For example, while a mission-specific DGX might be appropriate for training a unit in its specific mission tasks, a non-specific DGX could contribute to the development of adaptability-related skills. In addition, there will be joint learning needs that cross service boundaries that T2 might be designed to meet. For example, when training a joint chain of command or a chain of coordination or functional support that crosses service lines, JKDDC or JNTC could provide learning tools that address both the specific tasks and the adaptability-related tasks that these CLTs must perform in coordination with each other.

IX. CONCLUSION

In the first three tasks of our study, we have concluded that DOD can best meet the goal of preparing US forces to respond to asymmetric threats by preparing individuals, commander/leader teams, and units to adapt to the unpredictable challenges offered by the asymmetric threats associated with future war. Our review of current training and education practices in DOD suggests that DOD can insert adaptability-

related training and education tools into the DOD learning program. Moreover, it suggests that commanders will be likely to support such insertions as they become increasingly aware of the importance of learning adaptability to success on 21st century battlefields. IDA has identified a number of potential adaptability learning tools and will continue to develop our understanding of these tools as we proceed with Task 4 of this project.

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Appendix A
S.E.N.S.E. AND ADAPTIVE LEADER TRAINING

CONTENTS

I.	An Adaptive DoD Learning Environment	A-1
II.	Collaborative Planning—The New Training Paradigm for Adaptive Leaders.....	A-4
	A. External and Internal Adaptation.....	A-4
	B. Coordination and Adaptation.....	A-5
III.	S.E.N.S.E.....	A-5
	A. How S.E.N.S.E. Works.....	A-7
	B. S.E.N.S.E. Application	A-12
IV.	The Road Ahead—Extending S.E.N.S.E. into the DOD Learning Environment	A-16
	A. Important Differences and Distinctions.....	A-17
	B. Regional Security Application.....	A-18
	C. Process Mapping for a DOD Regional S.E.N.S.E. Learning Environment.....	A-19
	D. Computer-Assisted Decision Support Tools for the Regional S.E.N.S.E.	A-20
	E. Global S.E.N.S.E.	A-20
	F. Process Mapping for Global S.E.N.S.E.	A-21
	G. Computer-Assisted Decision Support Tools for Global S.E.N.S.E.	A-22
V.	Using S.E.N.S.E. as a Mission Planning Tool	A-22
VI.	Combining Training for Adaptive Leaders and Mission Planning	A-25
	A. S.E.N.S.E. for the Joint, Inter-agency, and Multinational Level (JIM)	A-25
	B. S.E.N.S.E. for Combatant Commanders.....	A-26
	C. S.E.N.S.E. for Units.....	A-26
	D. Challenges Associated with the DOD S.E.N.S.E. Regional and Global Simulations	A-26
VII.	Conclusions	A-27

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Appendix A

S.E.N.S.E. AND ADAPTIVE LEADER TRAINING

I. AN ADAPTIVE DOD LEARNING ENVIRONMENT

The Training Transformation (T2) challenge for the Department of Defense is how to expand the DOD learning establishment to cover the full spectrum of strategic decisions and military operations envisioned in the department's capability-based planning. Many studies have noted that the demands of today's real time, digital, networked world compel leaders, even at the highest levels, to focus their attention at the tactical level. The issue is how to provide a training environment in which leaders and leader teams learn to think strategically and creatively to anticipate and address unforeseen challenges.

The transformed DOD learning environment must prepare defense decisionmakers and their supporting staffs to operate effectively in a new strategic environment and must address all the elements of national power (Military + Information + Diplomatic + Legal + Intelligence + Finance + Economic = MIDLIFE). The training environment must provide a systematic framework for crisis identification, avoidance, management, and remediation and engender valuable insights on complex MIDLIFE issues in the achievement of national political objectives and policy goals for defense decisionmakers and their supporting staffs. The DOD learning environment would ideally include a real-time, interactive network or virtual environment in which leaders and leader teams could experience a complex contingency (defined at the level being trained), including the ability to collaboratively develop and assess crisis response options and examine their implications.¹

This training environment would bridge the many sources of discontinuity between the separate military, political, social, and economic simulations that currently populate the DOD learning environment. Currently, these simulations are not integrated

¹ Such an environment could be similar to the real-time training environment envisioned by DARPA and its DARWARS project, which is intended to train mainly TTP.

into a coherent system for training and learning. This deficiency is also a problem in the non-DOD interagency learning environment, where simulation is used infrequently for training.

At a minimum, the new training environment would reinforce the following principles for adaptive learning:²

- ***The environmental domain is different from that of the Cold War.*** Complex problems require complex inter-organizational, and in many cases, international or coalition solutions. Strategic and adaptive leaders must deal less with their own organizations and more with an external environment in which they have little hierarchical authority and must rely on persuasion, collaboration, and compromise. Leaders must appreciate the complex issue networks whose participants are often shifting, fluid, and anonymous and are often driven by passions and ideas without being clearly in control of programs and policies. Problems and solutions in this decision environment are more political, making the search for common values that can tie these networks together more important.
- ***The view of one's own organization becomes broader and set in a wider system ecology.*** The DOD learning environment should be premised on the notion that leaders are now dealing with a higher order of "systems within systems;" thus, the complexity of leading change becomes extraordinarily challenging, perhaps even to the point that this web of systems is unknowable. Leaders and leader teams must learn that suitable adaptation can only occur when they influence the conditions for change rather than imposing change and metrics from the top. The tension in this learning environment is leader recognition that change is hard because others overestimate the value of what they are giving up and underestimate the value of what they might gain by changing. The norm of the transformational training is to replace incremental improvement by going to a different place, or in modern parlance, "going outside of the box."
- ***Trust and accountability, not formal positional authority, are the prevailing values.*** For DOD leaders and leader teams, that means thinking nation first and DOD second with the ultimate goal of making the outcome mutually beneficial to each. In short, adaptive leaders must learn how to reach the

² Paparone, Christopher R., and James A. Crupi, "Insights for the Emerging Strategic Leader," Version 3.0, June 2004, pp. 4–7.

Pareto Optimum³ for all participants and stakeholders in the decision process rather than seeking short-term, suboptimal solutions.

- ***Strategic and adaptive thinking and acting are a matter of attending to a set of problems that are “wicked,” or interconnected in very complex ways.*** These problems are very expansive and require others outside the organization to address them. Many of our national security issues must be managed rather than solved—and some may never be solved, but rather, resolved repeatedly because there is no systematic procedure to get a definitive answer. The DOD learning environment must accommodate the need for learning an open logic or pluralistic view of competing groups vying for their narrowly held interests. Similarly, the learning environment must capture political processes in which decisionmakers decide not to decide, or equivocate.
- ***Personal leadership orientation affects strategic interpretations in ways that create significant organizational downstream effects.*** This element of the DOD learning environment must assist leaders and leader teams in understanding the pitfalls of measuring success in quantitative terms (the US military in Vietnam) and the importance of qualitative thoughts and assumptions, beliefs, and deep commitments and values (i.e., Ho Chi Minh). This learning environment must inculcate a deep understanding of beliefs and values about leadership (one’s own and others).

West Point Professor COL Don Snider (Ret.), a leading scholar on military professionalism, has noted, “Bureaucracies focus on efficiency of repetitive, routine operations using non-expert knowledge applied through a variety of means of which humans are only one, and quite often not the most important one. In contrast, professions focus on effectiveness in non-routine applications of expert knowledge. . . applied mainly by humans deeply developed by schooling and experience and applying their expertise through a variety of means, perhaps the most important of which is the repetitive exercise of human judgments.”⁴

That is the essence of adaptive and professional strategic leadership. The challenge for the DOD learning environment is to understand both the differences between efficiency and effectiveness in decisionmaking and, more important, to help

³ A situation is Pareto-optimal if by reallocation you cannot make someone better off without making someone else worse off.

⁴ Don M. Snider, "Jointness, Defense Transformation, and the Need for a New Joint Warfare Profession," *Parameters*, Autumn 2003, p. 21.

adaptive leaders and leader teams learn to recognize and then fuse the two to deal with our 21st century security challenges.

II. COLLABORATIVE PLANNING—THE NEW TRAINING PARADIGM FOR ADAPTIVE LEADERS

Adaptive leaders and leader teams are required at all levels to cope with conditions of high uncertainty and rapid change where they often need to initiate action and adapt plans on-site to accomplish a mission or goal, or in some cases, redefine the goal. The DOD learning system must provide the cognitive and relational skills that are the sine qua non of enhanced adaptability.

Adaptive leaders and leader teams are able to make the necessary modifications to plans, organizations and organizational processes, or both, in order to meet new challenges. The nature of adaptation is complex, encompassing a number of dimensions. Two key aspects of adaptation are useful for defining the DOD learning environment in which adaptive leaders and leader teams must train and operate in the new strategic environment.⁵

A. External and Internal Adaptation

“External adaptation” is replanning that takes place during plan execution, with a focus on the way that resources are applied to alter the external situation. In like manner, “internal adaptation” refers to changes that a team may need to make in its own organization or operating procedures for carrying out plans. Failure to understand the differences results in confusion about the focus of the adaptation. The challenge of external adaptation is to modify, often on short notice, a plan already in progress—assessing outcomes and reassigning resources given the plan’s current configuration and the probability that changes may very well create unintended consequences. For internal adaptation, leaders and leader teams observe themselves and the way they are working to see if it is necessary to develop new or adjust existing routines or organizational structure. Internal adaptation is based on process feedback and assessment.

⁵ This section and the immediately following section are based on Gary Klein, *Adaptive Teams*, A report prepared for the U.S. Army, January 2001.

B. Coordination and Adaptation

“Coordination” has been defined as the realization of high levels of efficiency and effectiveness in managing the degrees of freedom to achieve a task. Dexterity—problem solving—is needed when the situation becomes unpredictable. Leader and leader team adaptability is the ability to find a solution for a wide variety of problems under unpredictable conditions. It is based on the ability to improvise and depends on the ability to anticipate reasonably what is going to happen rather than being perpetually surprised. At the team level, degrees of freedom can be increased by cross training, to allow more interchangeability of staff.

Because adaptation is a break with routines, it can engender confusion and a desire to revert to the comfort of old norms and processes. External adaptation can be counterproductive when it focuses on short-term needs or a crisis state and ignores the long-term requirements and need for steady-state operations. Expert performance by adaptive leaders and leader teams reflects an acute awareness of future events, anticipation of new challenges, and knowledge of when to make adaptations and when to persist with an adequate plan.

Inherent in this transformed DOD learning environment is the need for a systematic framework for crisis identification, avoidance, management, and remediation that leads to adaptive responses to complex issues for leaders and their leader teams. A seamless virtual environment that enables leaders and leader teams to collectively experience a complex contingency, including the ability to collaboratively develop and assess crisis response options and their implications may be able to meet this need.

III. S.E.N.S.E.

In 1996, the Institute for Defense Analyses (IDA) established a centrally funded research project called Synthetic Environments for National Security Estimates, or S.E.N.S.E. IDA designed this project to provide an environment in which senior leaders could gain insights on the complex crisis planning operations that characterized the new national security challenges facing the United States following the end of the Cold War. S.E.N.S.E. was designed to leverage human interaction with computer modeling to provide insights on how leaders and leader teams might combine diplomacy, economic leverage, human rights initiatives, and military power, i.e., the full range of MIDLIFE, in innovative ways on battlefields that increasingly would be characterized by nonlinearity and asymmetric threats.

Since its inception, S.E.N.S.E. has evolved into a widely applicable learning tool suitable for desktop distributed interactive simulations that simultaneously address economic, social, political, and military issues. To date, IDA has deployed two types of simulated environments: (1) a prototype information warfare simulation for proof of principle, and (2) a fully developed nation-building simulation, originally developed at the request of General Wesley Clark, the NATO commander, for use in the Balkans, and since modified to meet the needs of the provisional government in Iraq. In addition to its application in Iraq, the nation-building simulation (AKRONA) has been used to assist governments in the Bosnian Federation, Montenegro, Kosovo, and Georgia to understand the issues involved in transitioning from a command economy and/or a post-conflict situation to a market economy in a democratic society. The US Agency for International Development has used the nation-building simulation with more than 50 country directors to allow them to “walk in the shoes of,” or gain insights about, the agency’s local constituents. The current version of the nation-building simulation contains modules that allow participants to learn (and develop intuition) about the impact that policy and resource decisions can have on social issues, military reform, economic policy (fiscal and monetary policy and privatization), disease pandemics such as HIV/AIDS, resource development and depletion, terrorism, and social and political stability.

The current AKRONA version of S.E.N.S.E. is a distributed interactive simulation facilitated by a network of computers. Participants assume roles in a simulated environment in which they must make policy and resource allocation decisions. The computer models operate interactively to simulate the results of those decisions. Only participants make policy and resource decisions. Decisions are all “human-in the-loop” and constrained only by the attributes of each decisionmaking entity. Thus, S.E.N.S.E. provides policy and decisionmakers an opportunity to practice real world decisionmaking, to develop intuition about the likely impact of their decisions, and to obtain feedback on their decisionmaking skills and on their level of adaptability. Rather than replicating reality precisely, S.E.N.S.E. involves player interactions, instead of computer models or intelligent agents, to emulate established or desirable cross-institutional relationships and interactions. Importantly, S.E.N.S.E. has the capability to operate in real time for tactical, day-to-day decisionmaking or in compressed real time in order to provide a dynamic environment in which the participants can project themselves from a base case present situation out 10 to 15 years into the future (if need be) in order to garner insights about the 2nd and 3rd order impacts of their autonomous decisions.

To facilitate rapid understanding and direct personal involvement, the S.E.N.S.E. architecture employs three principal learning tools. These tools were initially derived in the Army's Battle Command Training Program (BCTP) and are essentially the same tools that are used in BCTP and JNTC exercises today. The first is a seminar designed to provide participants with factual knowledge of the scenario and to reinforce learning. The second is the simulation itself, in which participants interact with each other to solve problems, make plans, and implement decisions. The third is a direct feedback or After Action Review (AAR) session for each period of simulation. These AAR discussions are designed to provide feedback on adaptability-related skills of *intuition*, *critical thinking*, *self-assessment*, and *social skills* as well as to test hypotheses, policies, and strategies. Finally, in addition to direct feedback from the simulation, AARs can be used to focus on the collective outcomes and independent decisions of the simulation and to elicit participant views, provide player-to-player discourse, reinforce important principles and lessons learned, and assist with mutual understanding across ethnic, religious, cultural, organizational, and institutional boundaries.

Thus, SENSE has the potential to be a tool for learning both the specific knowledge-related aspects of the contemporary operating environment (COE), e.g., the nature of 4th generation war, while simultaneously learning adaptability-related skills. In the current employment mode, the S.E.N.S.E. seminars focus on facts, processes, and procedures and for the most part, the learning will be knowledge-related. In contrast, mentoring during the simulation by senior mentors and tutor coaches, direct feedback during the simulation, and the AARs currently focus on developing knowledge on the metaskills of intuition, critical thinking, self-awareness and social skills.

A. How S.E.N.S.E. Works

The AKRONA version of S.E.N.S.E. was designed to cause senior leaders in post-conflict societies to think about "winning the peace." It was designed to accomplish two specific objectives: to teach "Economics 101" (through insights continuously updated by practical experience) without lecturing "Economics 101" and to break down communications barriers between ethnic groups that would face away from each other when in the same room. Experience with a number a diverse training audiences has proven the value of S.E.N.S.E. as a training tool to improve cross-cultural and interdisciplinary communication and to gain insights for adaptive decisionmakers.

As noted earlier, the principles guiding both the technology used to support the AKRONA simulation and the types of human interactions encouraged through scenario play derive from extensive DOD work in the area of virtual combat modeling. The AKRONA version of S.E.N.S.E. is a distributed interactive simulation facilitated by a network of computers to record and account for decisions by participants—and all decisions are “human-in-the-loop.”⁶

AKRONA has been peer reviewed three times by outside experts in the fields of economics, psychology, and peace operations and modified to include these experts’ recommendations for additional capabilities for the system.

In order to provide a realistic economic and democratic governance experience, the AKRONA version of S.E.N.S.E. is a virtual economy with both a private sector and a public sector. The private sector currently supports 25 economic sectors plus a natural resource sector that is a government monopoly. All sectors of the economy are linked to the global economy. The attributes of government include its control over taxes, tariffs, military and social spending, national transportation infrastructure, and resource depletion; the government can influence investments by the private sector on a sector-by-sector basis. The computer network tracks Player economic interactions and decisions while *personal interactions are key to learning via responsive feedback* from the simulation architecture. Over time, the AKRONA version of S.E.N.S.E. used with participants from Bosnia, Kosovo, Montenegro, Georgia, USAID, and Iraq has come to incorporate the following training topics:⁷

- How a market economy functions
- The role of entrepreneurs, risk-taking, leverage, and capital investments
- The need for a strong legal foundation as the basis for enforcing contracts
- The critical importance of dialogue and transparency among the myriad players in the private and public sectors
- The role of macroeconomic decisions in affecting economic opportunities
- The need to balance domestic needs with demands of the international/donor communities

⁶ White, Richard H, William Fedorochko, Jack LeCuyer, David Davis, and Dayton Maxwell, *Regional Security Application and Checkmate!*, IDA Paper P-3512, Institute for Defense Analyses, Alexandria, VA, April, 2000, p. 8.

⁷ Ibid., pp. 9–10.

- The interplay of defense spending, military reform, and the national economy
- How to achieve long-term national prosperity and rising social welfare
- The need to develop a vibrant market economy that includes, but is not totally dependent on, oil revenues
- The dilemmas posed by the need to privatize state-run industries
- The problems posed by the need to resettle refugees and displaced persons.

To facilitate achieving these learning objectives and add realism to the simulation, the nation of AKRONA can be tailored to reflect the economic, social, and demographic characteristics most closely aligned with the participants' own environments. Thus, AKRONA provides the “fig leaf” for participants to identify with the environment and address problems presented, while setting aside their personal biases. In this way they can explore without penalty new, adaptive and workable structures and conventions to deal with a wide range of real-world economic, social, and governance problems.

S.E.N.S.E. can be tailored from a very high level “S.E.N.S.E. lite” executive session of 1–2 days (fewer seminars) to an ideal simulation of a week’s duration:

The current version of AKRONA includes six major player types organized according to economic, and in the case of the government, governance through cabinet ministers and their budgets and policy portfolios. Each cell contains two personal computers, a tutor-coach, a translator, and three or more simulation participants. Professionals from western governments and the private sector represent the interests of the US, the E.U., international organizations such as the IMF and World Bank, foreign investors, international and local non-governmental organizations (NGOs), and foreign governments. These participants use the simulation as a vehicle to provide real-world lessons by making private and foreign investments, providing capital, and entering into joint ventures with domestic firms.

Participants in the AKRONA version of S.E.N.S.E. uniformly have displayed a very active and enthusiastic role in the workshops and simulations. Players interpret the scenario and exhibit behavior characteristic of their real-world environments during the course of the simulation. In fact, in an executive-level simulation for the Tri-Presidency of the Bosnian Federation, as much learning was done by the heads of key western organizations as by the Tri-Presidency. Insights that were only possible by projecting well-meaning (but many times conflicting or negatively reinforcing) policies into the

future became the basis for adaptive behavior on both sides of the table. In all simulations to date, the players have quickly learned that cooperation, communication, interaction, bargaining, and negotiations are essential ingredients for developing adaptive solutions to the “wicked” problems in post-conflict societies and for successful behavior in societies evolving from command economies. The non-threatening atmosphere of AKRONA and a very engaged training audience have inevitably led to open and frank discussions and exchanges of views, new insights, and adaptive solutions to complex problems.

A S.E.N.S.E. exercise at The Hague in 1999, for example, immersed 40 Montenegrin government and private-sector participants in a simulated democratic, free-market society. The experience enabled them to gain invaluable insights into the workings of a free-market-based, competitive economic system. It also reinforced the need for effective communications among governmental, commercial, and non-governmental entities, particularly when the objective is to achieve long-run stability and economic and social prosperity. As General Wesley Clark (Ret.) noted in a follow-on interview with *Defense News*, “What we’ve learned is that you can’t achieve stability if you can’t achieve prosperity.” This learning experience was primarily adaptability related and engaged participants in an environment that helps to convey an understanding of complex, inter-disciplinary issues as noted by sophisticated simulation participants, former senior government officials, and well-known academics:⁸

- Sandra Berberovic, Office of the Montenegrin Deputy Prime Minister for Social Issues: “This is an interesting game and I really enjoyed seeing my government work as a team, which is not an opportunity when you work in one Ministry—you do your job and you don’t get a chance to see how the whole system functions.”
- Mila Kasalica, Bank for Development of Montenegro: “I will try to explain to my colleagues and collaborators that responsibility is the key to everything. It’s not just a phrase, it’s really a good thing when you cooperate and are responsible for your actions.
- Jerome Visser, Manager, Ministry of Defense, The Netherlands: “The most important thing about this simulation [is] that, unlike other simulations, it’s very interactive . . . normally in a simulation you would only see results after a day and here after 15 minutes you already learn what is happening and then have to really anticipate what is going on in the world. So the learning curve is very steep – and that’s very good.

⁸ White et al., *Regional Security Applications*, pp. 12–13.

- Stephen Moses, CEO of Moses Interests: “It was very realistic. People got into their roles and really reacted the way they would react in real life. Many of the decisions we saw them making were very much like the kind of thing that we (businessmen) have run into as we’ve been trying to do business in this part of the world.”
- Dr. Colin Bradford, Department of Economics, American University, and former USAID Economist: “The thing that impresses me frankly is that there’s almost a degree of solemnity involved in the way these people are playing the game. I think that they’ve realized that this AKRONA economy in the end is not just AKRONA but in the back of their minds they are aware that it is a realistic economy and a realistic situation of what they face at home. So the thing that impresses me is the seriousness with which they seem to be playing the game and taking the outcomes as lessons they can apply when they return home.

Most recently, an anonymous player in a 2-day executive version of the AKRONA S.E.N.S.E. simulation on January 11–12, 2005 noted:

Wednesday went much better than Tuesday. To be honest with you, I left Tuesday very frustrated and unhappy with my experience to some extent. But I came back Wednesday enthused and ready to work, and we did really well as a Parliament as a whole working together to turn our aspects of the economy around quickly. Looking back, it was an amazing experience; to work with so many different people on different levels to solve problems was exciting. Communication definitely improved as we went on which I think is the key. . . . I think it (S.E.N.S.E.) is an amazingly useful tool and should be promoted as a tool used by many more people around the world. It was not until mid morning Wednesday that the extent as to which coordination was needed came out. Obviously you assume you have to work together but some type of plan was needed or a rhythm established. It just took a while. Those are the kinds of lessons I took from it, hit the ground running in an environment like this but keep all communication lines open and expand them as much as possible to cover more area. Tuesday I felt like I had no direction or goals except to “get better.” Wednesday we set agendas and goals to achieve and proceeded to work with all levels and parties to reach them. I am really looking forward to participating in more of these types of simulations. I think you would have seen the change as I did between the two days. It was crazy how different they were. Obviously no model will be perfect, some changes need to be done and I am sure they will rework some aspects of it but as a first run of this new version (of S.E.N.S.E. AKRONA II), I felt good about it and honored to participate.

Many of the participants in the AKRONA I/II versions of S.E.N.S.E. have gone on to occupy key positions in their respective countries. Ironically, President Eduard Shevardnaze used S.E.N.S.E. as the kickoff event for his Project 21 to modernize the Republic of Georgia and sent the leader elites to participate. Half of the new cabinet ministers in Georgia have participated in the simulation, and the Government of Georgia is now seeking to import S.E.N.S.E. to their country to train a new, adaptive leadership. The current Chief of the Iraqi military forces as well as the presiding judge in the trial of Saddam Hussein are more recent participants in the simulation. Additional Iraqi leaders were trained with the current version of AKRONA during the fall of 2004 and the summer of 2005. In short, S.E.N.S.E. has evolved into a widely applicable architecture for desktop distributed interactive simulation capable of addressing military, economic, political, and social issues while simultaneously developing the full set of adaptability-related skills noted earlier.

B. S.E.N.S.E. Application

The underlying philosophy of the S.E.N.S.E. architecture is to create a seamless virtual environment by connecting existing commercial and government information technology capabilities or models in such a way as to simulate the elements of the Contemporary Operating Environment (COE) that are important to achieving the adaptive learning objectives. S.E.N.S.E. also involves emulating, not replicating reality. Entity-based player-in-the-loop interactions provide the basis for emulating established or desirable cross-institutional interactions and relationships. Computer modeling, tools, and data bases are employed to create the “player environment” and to emulate processes that are too complex for humans to accomplish in compressed real time or that would require larger numbers of qualified players than are readily available.⁹

S.E.N.S.E. offers the unique opportunity to start with a set of boundary conditions and offer simulation play in compressed real time that reflects human-in-the-loop decisionmaking by a set of player entities, each of which has its own set of attributes. Current applications of S.E.N.S.E. were developed to meet a specific set of criteria by each of the national sponsors for the simulations, much in the same way that training objectives are developed for BCTP and JNTC. Future applications of S.E.N.S.E. in a

⁹ White et al., *Regional Security Applications*, p. 15.

DOD learning environment are also possible with a well-defined set of learning objectives and criteria.

The S.E.N.S.E. methodology for design of a virtual environment for educating and training adaptive leaders and leader teams at every level begins with a clear definition of the learning objectives. S.E.N.S.E. focuses on developing insight and intuition rather than on prescriptive or quantitative outcomes. Five critical factors and interrelationships are particularly important for developing a DOD S.E.N.S.E. simulation to transform our current Cold War training paradigms and make them relevant for developing adaptive leaders and leader teams in the 21st century. These factors include:¹⁰

- *Definition of the conceptual domain or virtual exercise space in order to facilitate possible future extensions and provide flexibility.* For example, sponsors for the SENSE simulation in Bosnia and Georgia specifically wanted to address the issues of military and economic reform; USAID chose to focus on the impact of pandemic disease (HIV/AIDS) and resource depletion as obstacles to economic development. In an executive-level session with the Tri-Presidency of the Bosnian Federation and key western officials, participants learned that well-meaning programs for military reform, privatization, and refugee resettlement when vigorously implemented at the same time had severe unintended consequences for unemployment and, thus, political stability. Each of these S.E.N.S.E. applications resulted in significant insights about issue resolution, strategy coherence among competing external agencies and host nation governments, and adaptive behavior at the leader and institutional levels. DOD will have to develop an appropriate set of adaptability learning objectives if S.E.N.S.E. is to be employed in the DOD learning environment.
- *A logical, effective, and relatively simple organization of players and simulation support tools.* Participants will represent player positions with certain attributes and functionalities and will be organized into teams and cells. External adaptability is facilitated by enabler tools required for the participants to command or commit resources. Such tools might allow participants to build an operational strategy, task organize a joint or combined force, direct troop movements, determine budgets or the rates of production,

¹⁰ White et al., *Regional Security Applications*, pp. 15–34.

respond to enemy initiatives, etc. Similarly, internal adaptability is shaped by forum tools that facilitate the political fabric and process of scenario execution across player entities where resources are not directly commanded. For instance, one tool might allow players within a game entity to function as the Joint Staff, while other tools may exist to enable communications across the cells comprising the Combatant Commands (COCOMs) and the services as well as the National Security Council (NSC) and the United Nations (UN). A full range of organizations could be emulated to include: governments; international organizations such as the UN and the EU; non-governmental organizations; for-profit corporations; military organizations and capabilities; and rogue nation-states and terrorists. The organizations required are not predetermined but are defined by the simulation sponsor. Thus, one could have several different versions of S.E.N.S.E. depending upon the training and learning objectives of the participants. In a DOD-focused model, the Office of the Secretary of Defense, the Joint Staff, relevant Combatant Commanders and Defense Agencies, the Services, and Joint Task Force headquarters could all be player cells. S.E.N.S.E. would also contain Red cells. The underlying principle of S.E.N.S.E. is a virtual world, which *facilitates discussion of real-world issues using the fig leaf of a simulation* rather than the baggage of one's real-world organization as the start point. Thus, the same global S.E.N.S.E. simulation could be used by multiple learning organizations—AWC, NDU, or a COCOM—without major changes.

- *Definition of the major roles, responsibilities, attributes, and interrelationships of player organizations and entities, and if required, modification as the game progresses and the simulation evolves.* The issue is not the specific entities engaged in a given scenario, but rather, the *functionalities* of the types of organizations or actors that might be represented. By developing an exhaustive set of functionalities from which any type of entity in a scenario might be created, the S.E.N.S.E. virtual environment may be used to address a broad spectrum of multiple, concurrent crises.
- *Establishment of a player functionality crosswalk that minimizes the number of distinct computer assisted tools and enablers that must be developed.* This requires the definition of player and organizational cells, their functionalities,

and the event and schedule-driven decision processes for player entities that build the scenario and outcomes for complex contingency situations. In this regard, it is important to recognize that there are some uniquely military capabilities that cannot simply be combined with civilian entity functionalities. These include the need for warfighting adjudication, force readiness, force deployment, force structure and composition, lift, logistics, and changes in technological capabilities over time. The importance of the entity and functionality crosswalk is the common denominator and central to creating the institutional interoperability necessary for successful cross-organizational communication.

- *Addressing the logic of time, geospatial, and resource constraints to ensure gainful insights, particularly on complex problems involving many entities and variables.* This requires that all players be treated equally according to the time dimension but differently according to their endowments with regard to spatial and resource constraints. Thus, a month compressed into a 5-minute game period is the same for all entities; what differs is their decisionmaking cycles and processes that range from a 12-month government budget cycle to a matter of hours for an insurgent to identify and attack key targets. This is especially true with regard to adversaries since the purpose of the simulation environment is to gain insights about the behaviors of different participant types and the conditions under which they will act. By allowing all participants to act without outside influence, the players themselves gain insights about how and why decisions were made from different perspectives. The AARs offer a forum for trading those insights and intuitions to gain better mutual understanding of how people are likely to react in different types of situations. S.E.N.S.E. allows for simultaneous tactical, operational, and strategic decisionmaking and for the participants to see results of those decisions and their interactions. This experience of describing decisions and seeing results, intended or otherwise, contributes to the development of intuition and critical thinking that define adaptive leaders and leader team behavior.

IV. THE ROAD AHEAD—EXTENDING S.E.N.S.E. INTO THE DOD LEARNING ENVIRONMENT

Successes in multiple deployments of the AKRONA versions of S.E.N.S.E. over the past 7 years suggest that it is possible to create other DOD versions at the national, regional, and local level. These versions will allow leaders and leader teams at every level to learn adaptability by providing a reliable, real-time, and responsive means for practicing different approaches to national security decisionmaking in a virtual world and getting feedback on those decisions.

Although the current versions of S.E.N.S.E. are primarily economic simulations, there are many opportunities for incorporating non-economic simulations into S.E.N.S.E. If one thinks of the varying phases of a crisis as an unfolding stream of complex interactions, then it is important to ensure that the results of military engagements be fed back into the economic and socio-political dimensions of the crisis. Budgeting and cost decision models can and should be integrated into the S.E.N.S.E. architecture. Finally, advanced and emerging command and control efforts—networked versus hierarchical—would find use in more advanced and ambitious DOD applications of the S.E.N.S.E. paradigm for training both knowledge-based and adaptability skills of leaders and leader teams.

Just as new applications of S.E.N.S.E. will require the integration of other simulations, a S.E.N.S.E. application to enhance the adaptability of our leaders and leader teams at every level will require that we map event-driven processes such as political and group processes, resource (financial as well as physical) allocation processes, military engagement and maneuver processes, internal decisionmaking processes for governing entities, and intelligence and information security processes. Three distinct decision environments must be mapped: the internal DOD decision process for strategic crisis action planning and response, the interagency process for dealing with complex contingencies, and the coalition-building process for interacting with other stakeholders in the international arena. With regard to the military engagement and maneuver processes and the tactical and operational levels, the primary purpose of extending the S.E.N.S.E. architecture is not how to address the issues of positioning and maneuvering and fighting military units, but rather, to gain useful insights on the role that military units might play (as an integral part of MIDLIFE) in different complex crisis scenarios. Thus, a regional security application for a Combatant Commander and the units on the ground would capture the non-traditional roles in which the military increasingly finds

itself during peace operations. This means that the virtual environment must enable players to interact and gain useful insights regarding the interactions of an indigenous population and foreign actors that include NGOs, the media, terrorists, and others.

In order to achieve realism, it is conceivable that the military players (as they have done in Iraq) would assume the responsibilities for governance, the judicial process, and local dispute resolution. Thus, the adaptive leaders going through the simulation as “military players” would have a menu of functionalities that is far broader than those associated with their traditional peacetime training and service charters.

A. Important Differences and Distinctions

There are important differences and distinctions between the economic game of AKRONA II and the proposed extension of S.E.N.S.E. into the DOD learning environment. Three tiers are currently envisioned for the DOD learning environment—local, regional, and strategic (global). The AKRONA version of S.E.N.S.E. was developed and subsequently improved with a very narrow focus in mind—economics and governance (“winning the peace”) in a post-conflict situation. For this purpose, it was not necessary to develop geospatial, conflict, or analytical capabilities for gaining insights on real-world issues. However, in order to move from a fictitious country in a post-conflict situation or emerging market economy to emulating support of deliberate and crisis action planning, these three dimensions must be included in a DOD S.E.N.S.E. situation:

11

- *Geospatial and Multi-site Capabilities.* The DOD S.E.N.S.E. simulation would expand a simplified, non-spatial, single-site implementation to a geospatial and multi-site dimension in order to address a broader range of issues and simultaneously reach a larger audience. The global version of S.E.N.S.E. would be designed to allow multiple crises—foreign and domestic—to be addressed sequentially and simultaneously from the NSC down to the JTF level.
- *Economic versus National Security Challenges and Options.* While AKRONA is fundamentally an economic game, the local crisis, regional, and global DOD versions of S.E.N.S.E. are envisioned as national security simulations in which the economic component would be used to address a broader range of issues and provide a means for simulating the impacts of natural and man-made disasters, embargoes, air campaigns, assessing overall stability, etc.

¹¹ White et al., *Regional Security Applications*, p. 36.

- *Gaming and Assessment Capability.* Unlike AKRONA, the DOD extensions of S.E.N.S.E. should be designed to provide either a training or a mission planning tool environment. In the training role, the DOD S.E.N.S.E. applications would serve as a means for adaptive leaders and leader teams to identify and rehearse the inter- and intra-institutional arrangements required to swiftly and decisively address crisis as they unfold in order to contain and minimize their impacts. As assessment and/or mission planning tools, the DOD S.E.N.S.E. applications could all feed real-time intelligence and other information in order to create a parallel virtual reality for doing “what if” assessments and for engaging in quick regional response games as part of course of action analysis and crisis response planning.

B. Regional Security Application

The primary purpose of DOD’s regional security S.E.N.S.E. application would be to enable Combatant Commanders, their supporting staffs, their component commanders, the proliferation of NGOs in today’s crisis areas, and interagency or coalition partners to gain useful insights on potential complex contingencies before they ever occur and to facilitate collaborative and adaptive planning on the “wicked” problems for such contingencies. Simulation at this level could address a regional military crisis, a specific local crisis (domestic or manmade disaster), or a combination of the two. Following are potential design goals and areas of interest:¹²

- Facilitate collaborative and adaptive planning within the US unified commands
- Promote the use of the interagency process in achieving adaptive solutions to complex crises
- Promote a common understanding among allies and potential and actual coalition partners, to include NGO’s and other international organizations
- Provide a convenient and sufficiently realistic means for assessing options, rehearsing approved operational plans, and crisis action planning
- Enable plans to be quickly reassessed and adjusted in light of real-time operational experience and changes in the objectives and forces available.

Combatant Commanders’ interests and significant issues could engage a broad array of concerns such as diplomacy, territorial issues, military activities, and political implications of a series of actions. Thus, the utility of traditional elements of national

¹² White et al., *Regional Security Applications*, p. 37.

power (MIDLIFE) would be examined as well as a host of “soft” or unquantifiable issues with political implications such as moral imperatives, international responses, conflicting agendas, aid programs, organizational priorities, military interventions, and sanctions. Equally important, each potential area of interest would also be mirrored in a common set of metrics to address such issues as refugees, destroyed housing, social indicators such as health and education, transportation infrastructure, deaths, and criminal activities.

C. Process Mapping for a DOD Regional S.E.N.S.E. Learning Environment

A S.E.N.S.E. learning environment for adaptive leaders and leader teams must realistically emulate the internal decisionmaking processes of key organizational entities and the interactions among those entities. For example, a S.E.N.S.E. application might simulate a simplified DOD-centric process that includes the following steps: ¹³

1. Notification of the unforeseen incident by the Combatant Commander and tasking of that commander by the NSC-DOD to provide a situation assessment, develop potential courses of action, and make recommendations for consideration.
2. Input to the Combatant Commander from the ambassador and country team, his own staff, component commanders, host nation principals, representatives of other nations in his area of responsibility, and other organizations, to include the NGOs and the intelligence community.
3. DOD review of the Combatant Commander’s initial assessment and recommendations and provision of guidance for further planning. This guidance would highlight Administration policy goals and objectives as well as direction regarding specific items of interest such as civilian casualties and collateral damage, and a timeline for achieving these objectives.
4. Development of the Combatant Commander’s plan for review and approval. Automated decision support tools would facilitate development of the plan’s major phases and timelines, forces, and projected buildup of force capabilities given the lift constraints, infrastructure constraints, and the distances involved.
5. NCA guidance for refinement and testing of plan via a dress rehearsal.
6. NCA decision to execute the plan, issue orders to military forces to deploy, and apply other elements of national power in consonance with an

¹³ White et al., *Regional Security Applications*, pp.38–41.

international coalition. These decisions might be accompanied by a public announcement of US intentions regarding the incident.

7. Conduct of military operations by deployed forces after their arrival.
8. Restoration of peace (or stability following a natural disaster) at some cost to local infrastructure and civilian casualties.
9. Disengagement of US and alliance or coalition forces and transition to a multinational peacekeeping force.

Included in each step of this scenario would be consideration and involvement of the other elements of national power (MIDLIFE) that are required to support such military operations to achieve national political objectives. In addition, new inter-institutional relationships that are required to achieve our foreign policy goals would be identified, especially in our own inter-agency arena as well as with international and non-governmental organizations. The S.E.N.S.E. event could incorporate many non-military means such as the use of NGOs, grants and loans targeted at specific problem areas—refugees, education, infrastructure, etc. At each step of the simulation, metrics and computer-assisted modeling would be required to provide participants with direct feedback regarding the results of their decisions over time.

D. Computer-Assisted Decision Support Tools for the Regional S.E.N.S.E.

The DOD S.E.N.S.E. learning environment will require the creation and use of a relatively small number of simple, generic computer-assisted support tools to facilitate effective game play. For example, the ability to rapidly project military power throughout the world is central to current US national security and national military strategies.

The speed with which we are able to apply military power—as well as the other elements of national power—is limited by the availability of strategic lift, domestic and foreign transportation infrastructures, transit rights, etc. To the extent that our response to a crisis involves coalition or alliance partners, we are often asked to provide strategic mobility support for them as well as our own forces. For the S.E.N.S.E. learning environment, a simplified approach that emulates the detailed computer models for the deliberate planning process is needed. This method would approximate important relationships among time, distance, available transportation and lift assets, and movement constraints, to include the effects of port, rail, road, and airport throughputs on an improved and unimproved basis. The transportation model would enable decisionmakers to quickly produce the “approximately right” answers that are critical to rapidly

exploring crisis response options in accelerated game play or in support of real-world crisis response planning. An appropriate model that could be incorporated into S.E.N.S.E. most likely already exists.

E. Global S.E.N.S.E.

The primary purpose of a DOD global S.E.N.S.E. simulation would be to enable senior decisionmakers at the local, regional, and national levels to gain important insights on very complex, interdependent, “wicked” issues, to include the challenges associated with responding to multiple, dissimilar crises at home and abroad. In the global application, in addition to those goals already outlined for the regional application, the following potential design goals and areas of interest could also be included:¹⁴

- Enable senior leaders at the national, regional, and local levels to gain useful insights on critical issues associated with responding to concurrent crises.
- Provide a convenient and sufficiently realistic means for assessing crisis response options and developing and rehearsing crisis action plans at the NSC and major department and agency levels.
- Provide an effective and efficient means for training and educating senior leaders and leader teams to be more adaptive in their roles. Issues that these leaders might have to contend with are the reactions of indigenous leaders and populations to different US measures, destabilization of a local government, regime change, and the longer-term health, economic, political and military implications of different courses of action.

F. Process Mapping for Global S.E.N.S.E.

Because the DOD global S.E.N.S.E. simulation would provide a means for addressing multiple regions of the world simultaneously, it must reflect or map the internal decision support processes of the federal departments or agencies that participate in NSC-level deliberations. Within DOD, the decision process would be decomposed into the major principals and their staffs— Secretary of Defense, OSD, CJCS, the Joint Staff, and the Military Departments.

Additionally, the global version of S.E.N.S.E. could be designed to address both long-term and short-term issues of potential consequence. For example, the simulation would include a resource (capabilities) planning and budgeting process for US civil and

¹⁴ White et al., *Regional Security Applications*, p. 43.

defense agencies as well as a simplified depiction of how each of these agencies might be represented for crisis response activities.

G. Computer-Assisted Decision Support Tools for Global S.E.N.S.E.

The DOD global S.E.N.S.E. would incorporate a suite of tools that allows participants to gain useful insights about the consequences or risks of applying available capabilities or elements of national power to competing actual or potential needs. These tools would include illustrative incident reporting formats for all three tiers as well as decision support tools that could be used by NGOs and other players to develop options and to decide what humanitarian assistance support might be made available to people during a crisis. These decision support tools would assist decisionmakers in separating the “wheat from the chaff” while offering them a broad range of opportunities to understand the strategic relevance of their work and how to focus intelligence collection resources on the imperatives. These tools would allow decisionmakers to personally experience the potential or alternative outcomes of analytical assumptions, knowns, inferences, and recommended courses of action. Thus, the decisionmakers would have convenient mechanisms for assessing the implications of alternative courses of action and the consideration of a series of moves, countermoves, and counter-countermoves.

V. USING S.E.N.S.E. AS A MISSION PLANNING TOOL

Crises imply extremely short decision cycle times. Both the regional and the global DOD versions of S.E.N.S.E. would provide a convenient way of rapidly constructing and testing different hypotheses based upon “knowns” and “inferences.” Because these simulations would combine the live, virtual, and constructive environments and would use compressed real time to project into the future, they would facilitate speculative “thought experiments” and adaptive learning for leaders and leader teams by incorporating inputs from decisionmakers as well as providing a means of testing alternative hypotheses, fostering inter-agency interoperability, and formulating alternative scenarios or rehearsing plans.

Results of both the proof-of-principle information warfare and AKRONA nation-building simulations suggest that the S.E.N.S.E. methodology and architecture can be extended beyond simply training adaptability to facilitate national-level decisionmaking. S.E.N.S.E. can be used to assess different national security policy issues and options during complex contingencies. It might also facilitate combatant commander planning

and execution of crisis response operations (to include winning the peace) and perhaps even the development of plans at the tactical, operational, or strategic levels.

A DOD S.E.N.S.E. architecture has the potential to provide a reliable and responsive means for assessing different national security policies and options during complex contingencies. Intelligence and information can be both injected into the simulation and derived from player learning that accumulates through interactions with other player entities. Importantly, S.E.N.S.E. offers the opportunity to establish a virtual environment that will enable senior decisionmakers as well as CLTs and staffs at every level to collectively experience a complex contingency while collaboratively developing and assessing crisis response options and their implications. Whether or not a chosen course of action proves to be effective in the long run is determined through a process of discovery as the simulation progresses and the success or lack of success of competing strategies or subsequent leader and leader team adaptability are revealed.

Prior to a crisis, both a global and a regional S.E.N.S.E. application could be used to determine the key decision factors affecting outcomes and how alternative futures might evolve.¹⁵

Three particular avenues of investigation are suggested:

- *Understanding Information from Different Knowledge Domains.* Decisionmakers today face the particularly difficult task of taking data from different knowledge domains—defense, economics, science, business—and using this data for effective crisis management. S.E.N.S.E. could enable CLTs and their staffs at the national and regional levels to transform data into information in order to make informed decisions.
- *Developing and Refining Intelligence Collection Requirements.* Decisionmakers today face the problem of information overload. S.E.N.S.E. could help staffs and decisionmakers separate the “wheat from the chaff” and thereby understand the strategic relevance of their work and how to focus intelligence collection resources on the imperatives of the contingency.
- *Assessing possible futures and outcomes.* S.E.N.S.E. could also serve as a convenient means for quickly immersing leaders in a potential complex crisis before it ever occurs by providing mechanisms for assessing the implications of alternative courses of action and the consideration of moves, countermoves,

¹⁵ White et al., *Regional Security Applications*, pp. 50–51.

and counter-countermeasures. Such fruitful avenues of inquiry leading to external or internal adaptation could well be:¹⁶

- What are the likely reactions of indigenous leaders and populations to the various types of diplomatic pressures, military intervention, economic and trade sanctions, and other punitive measures?
- What types of policies or actions on the part of the United States or its allies and coalition partners will lead to the stabilization or destabilization of a government or political party?
- What are the likely long-term health, economic, and military implications of different courses of action?

Similarly, during a crisis and the accompanying short decision cycles, S.E.N.S.E. could provide leaders and leader teams a convenient way of rapidly constructing and testing different hypotheses. Moreover, because it combines the live, virtual, and constructive actors in compressed real time, S.E.N.S.E. could facilitate thought experiments for testing hypotheses, fostering inter-agency interoperability, formulating alternative scenarios, and rehearsing plans.¹⁷

- *Testing alternative hypotheses.* Because S.E.N.S.E. employs compressed real time, it could allow decisionmakers to work through the consequences of events quickly and to assess many different strategies and courses of action and identify low risk, high leverage options. S.E.N.S.E. could also permit the use of off-the-shelf plans or courses of action as an initial condition or first approximation and thus provide an instant orientation in the real world situation.
- *Fostering interagency interoperability.* The use of S.E.N.S.E. to foster interagency networks and improve interagency working relationships before a crisis could improve our national ability to address complex contingencies and crises as they arise. Scenario play and rehearsal could permit the development of individual and agency positions before a crisis actually occurs as well as establishing a common language for discussing the particular aspects of a crisis.
- *Formulating scenarios and rehearsing plans.* It is critical to identify the decision factors that are most likely to influence outcomes. S.E.N.S.E. could enable the formulation of scenarios to identify threats, improve the

¹⁶ Ibid., pp. 43.

¹⁷ White et al., *Regional Security Applications*, pp. 5152.

interpretation of intelligence, interact prior to a crisis, and rehearse and refine crisis reaction plans.

- Assessing second- and third-order effects of near-term decisions. By projecting to as much as 10–15 years into the future through play in compressed real time, adaptive leaders could gain insights from the collective decisionmaking based on near-real time intelligence. As an example, the logical, but apparently unexpected outcome of the NATO air war against Serbia in 1999 was the dramatic increase in refugees and the concomitant need to commit, and in some cases divert, scarce resources to deal with the humanitarian problem. Use of the S.E.N.S.E. architecture at that time predicted such an outcome, just as use of the AKRONA simulation predicted the enormous problems created by the CPA's insistence on the simultaneous demobilization of the Iraqi Army and the rapid privatization of state-owned enterprises—a vast number of unemployed, many with military experience and expertise—that were all too ready to direct their anger and hostilities at being unemployed to American forces in Iraq.

VI. COMBINING TRAINING FOR ADAPTIVE LEADERS AND MISSION PLANNING

A DOD S.E.N.S.E. learning environment would provide a systematic framework for crisis identification, avoidance, management, and remediation that is both technically feasible and capable of producing valuable insights on complex issues for adaptive leaders and their staffs at every level—local, regional, and national (global).

A. S.E.N.S.E. for the Joint, Inter-agency, and Multinational Level (JIM)

Senior leaders at the national level continue to lack a capability that facilitates and fosters collaborative planning and organizational interoperability and coherence among government agencies involved in developing and assessing options, strategies, policies, and plans to deal with complex crisis situations, be they military or natural disaster. A S.E.N.S.E.-based virtual, interactive, man-in-the-loop environment that sufficiently emulates reality could be employed to enable national-level decisionmakers to gain useful insights about complex contingencies and the complex, interdependent multidisciplinary issues associated with meeting such challenges. A global strategic S.E.N.S.E. application addressing multiple simultaneous crises, regional as well as domestic, could be used in assessing and rehearsing policy options for senior decisionmakers. Additionally, a S.E.N.S.E. application could be used to assist in collaborative planning and to facilitate the integration of effort at the national level as

well as enabling leaders to run “what if” games to test and rehearse potential policy and crisis response options.

B. S.E.N.S.E. for Combatant Commanders

Nested within a global S.E.N.S.E. virtual world, we would expect to find regional applications addressing specific local and regionwide challenges for use in developing options and plans for dealing with major crises such as major natural disasters or growing ethnic or religious unrest and military conflict in the region as well as for training combatant commanders, CJTF commanders, and their staffs

C. S.E.N.S.E. for Units

The Information Warfare and AKRONA nation-building models offer insights to developing S.E.N.S.E. learning applications at this level, both for warfighting and “winning the peace.” Both models already contain the seeds for the development of a module for insurgencies that compete with the elements of democratization and economic growth required to underwrite stability in a post-conflict environment. An improved version could model unit missions—such as reconnaissance of a certain area—and include a Red Team player cell as one of the entities that would make its own autonomous decisions based on its own assessments of risk and opportunities. Feedback loops and real-time learning such as that reflected in CAVNET used by the 1st Cavalry Division in Iraq could be one of the dynamic elements of the simulation.

D. Challenges Associated with the DOD S.E.N.S.E. Regional and Global Simulations

The additional development that must be undertaken for each of these scenarios is a function of that which is already readily available and the developers’ ability to develop a flexible, multi-purpose architecture that leverages existing capabilities.

AKRONA indicates that there may be little need to develop new modeling and simulation for the economic aspects of the DOD S.E.N.S.E. simulation. The improved AKRONA simulation now being deployed to Iraq is proof that this principle can be done for a single model and that this model can be used by many participants as the heart of a distributed simulation.

There are a host of opportunities for incorporating non-economic simulations as a part of a DOD S.E.N.S.E. simulation. For military engagements, JCATS, JWARS, and

other combat models could be used, with the results being fed back into the economic and socio-political dimensions of the simulation. Budgeting and cost models such as DRMM and COST are available and may be easily integrated into a DOD S.E.N.S.E. architecture.¹⁸ Similarly, there are many command and control tools that might find use in more advanced and ambitious applications of the S.E.N.S.E. paradigm.

VII. CONCLUSIONS

Adaptation is the ability to make necessary modifications to existing plans or organizations and their internal processes, or both. The core of that ability is adaptive leader and leader team problem solving. Adaptation can involve a change in the planned use of resources, internal change in the structure of the team, or both. While team adaptability is the ability to make necessary modifications, effective teams do not always implement modifications due to the risks incurred every time a team changes plans. As Klein notes, “Wisdom is knowing when,”¹⁹ or as some enlightened military would say, knowing when “perfect becomes the enemy of good enough.”

Experience to date with the S.E.N.S.E. architecture suggests that it could be very useful in developing adaptable leaders and leader teams. New DOD editions of the simulation, along with its associated seminar, direct feedback, and AAR content, are achievable. Most, if not all of the technologies to support a global, regional, or local application are available on a commercial basis or within the suite of DOD models and simulations.

Many have written or commented on the need for a transformation in the way we train leaders, leader teams, and units to be adaptive in the new security environment. The collected comments are nearly always a catalogue of complaints about rigid adherence to the precepts of the training revolution that brought the nation success in Operation Desert Storm. Gary Klein has done much to collect these comments and to define the need for as well as the attributes of adaptive leaders and teams. In like manner, much of the preliminary conceptual work for the development of a S.E.N.S.E. training system has been accomplished by the S.E.N.S.E. design team at the Institute for Defense Analyses.

The proposed local, regional, and global applications of a DOD S.E.N.S.E. simulation would provide a virtual training and decisionmaking framework that would

¹⁸ White et al., *Regional Security Applications*, p. 52.

¹⁹ Klein, *Adaptive Teams*, p.6.

enable senior leaders and their leader teams to collaboratively experience crises, to include developing crisis response options and strategies. Equally important, these applications of S.E.N.S.E. would provide a means for training adaptive leaders and leader teams to unify organizational efforts and addressing the complex and “wicked” political, economic, and security issues that define our national security environment in the 21st century. S.E.N.S.E. has the potential to provide a capability to gain invaluable insights on complex, interdependent issues that our national security apparatus lacks today.

Because the regional and global versions of S.E.N.S.E. would have many commonalities in terms of processes, entity attributes, processes, decision outputs, and relationships, it appears that the most useful approach would be implemented in phases:

1. Use the existing AKRONA version of sense to train selected COCOM and other staffs as well as war college students in thinking about “winning the peace” in post-conflict situations. Involve the JNTC or BCTP in operating S.E.N.S.E. Evaluate the contribution that S.E.N.S.E. can make to the development of adaptability-related skills, as well as of specific knowledge, and, perhaps, of its utility as a planning tool. This first phase is capable of immediate implementation with no significant alteration to the existing S.E.N.S.E. model.
2. Develop a global S.E.N.S.E. simulation using a time-phased, evolutionary development approach to control risk and costs. This global application should be fully distributable and should ultimately contain the necessary technical features for developing adaptability-related skills, for building specific knowledge-based SKA, and for a true interagency deliberative and crisis action planning capability. The Global S.E.N.S.E. simulation should incorporate distance learning features in order to provide a fully distributable simulation environment. This second phase would require significant programming and other developmental effort costing perhaps \$3 to \$5 million.
3. Develop regional S.E.N.S.E. versions that would be derived from the global S.E.N.S.E. and would be more directly useful by the COCOM and other regionally oriented organizations. This third phase would be significantly less complicated and less expensive than phase 2.

Appendix B
THE BATTLE COMMAND KNOWLEDGE SYSTEM

CONTENTS

I.	What is BCKS	B-1
A.	Established Features	B-2
B.	New or Evolving Features	B-3
C.	Proposed Features	B-4
D.	BCKS and High-Performing Commander/Leader Teams	B-4
E.	Summary	B-6
II.	Expanding BCKS to the JIM Environment	B-8

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Appendix B

THE BATTLE COMMAND KNOWLEDGE SYSTEM

This appendix is based on the work of LTG Frederic (Rick) Brown (USA, Ret.) in his paper “Building High Performing Commander Leader Teams (CLT): Intensive Collaboration through BCKS.” This paper describes the Army program to more rapidly develop the Battle Command Knowledge System (BCKS) as a way to engender more capable teams of commanders and leaders in a modular Army fighting the Global War on Terrorism (GWOT). General Brown’s central premise and the premise of BCKS is that if leaders act as teammates between hierarchical levels and across echelons, then organizational performance will improve. Units with teams of commanders and leaders that habitually analyze and review their actions and make deliberate corrections do better than those that do not reflect and correct.

The goal of BCKS is to give commanders and leaders a greatly enhanced opportunity to develop those team skills through knowledge sharing and collaboration. This appendix describes the potential value of the Battle Command Knowledge System as a generator and sustainer of high-performing leaders and leader teams both in the US Army and then in the Joint, Interagency, and Multinational (JIM) environment. It describes the concept of BCKS as the Army is developing it and suggests ways to expand it to become a part of the DOD Training Transformation program.

I. WHAT IS BCKS

The Commanding General Combined Arms Center, TRADOC, supported by Department of the Army G3 and Chief Information Officer/G6, is responsible for developing the Battle Command Knowledge System (BCKS). BCKS will be an Army level knowledge management system to support soldiers and leaders in the performance of their respective operational mission(s). The main thrust of BCKS is to support the operational domain with secondary support to the institutional domain. BCKS will provide ongoing, near-real-time support to the Army’s battle command, doctrine development, leader development, and education and training programs.

A. Established Features

BCKS represents the Army's effort to transform its knowledge management processes from their current state to a fully integrated, interoperable network-centric capability that supports training, leader development, battle command, and doctrine. It is a knowledge management process organized to provide the capabilities necessary to support Army and Joint operations in virtually any JIM environment. BCKS comprises product lines, architectures, standards, management, evaluation and resource processes that generate, manage and use knowledge to enable effective warfighting. It will operate on the Army's Web-based system known as Army Knowledge Online (AKO).

BCKS is the Army's only enterprise Knowledge Management Program that focuses on the warfighter. It is the Army's designated integrator for knowledge management applications focused on the operational Army. BCKS provides direct and general support to individual unit and professional forums as the basic building blocks of the enterprise system. BCKS provides enterprise-level support by integrating existing and future efforts into a common approach. BCKS focuses on Soldiers doing the profession of Soldiering. BCKS will ultimately consist of seven operational networks, coordinated by a central management office. These networks will each consist of a central Integration Office that provides management and support over several support teams, each of which supports several forums or communities. The three major networks are the unit, leader, and warrior networks, as described below:

The Unit Network

- Composed of numerous, distributed unit networks organized around the Army's major formations
- Initial focus: units executing or preparing for OEF and OIF and their immediate or pending mission
- Services:
 - Provide Information, Share Knowledge, Validation
 - Single Point Request for Information
 - Virtual Right Seat Ride (in contact and not in contact with an enemy force)

The Leader Network

- Composed of numerous, distributed networks that provide the ability to link commanders, leaders, staffs, and NCOs from across the force
- Establishes horizontal, peer-group forums, connected through on-line collaboration systems
- Peer discussions enable shared learning and knowledge generation based on experience
- A group of dedicated professionals “talking about their business on the front porch”

The Warrior Knowledge Base

- A Web-based, central repository of data, information, references, and knowledge (objects) needed by BCKS users
- Focused on achieving information interoperability across the objects
- Provides Army leaders an expanding site to pull from and enables “one stop shopping” for their professional knowledge requirements

B. New or Evolving Features

While much of what is being done as part of BCKS is primarily application of information-sharing and collaboration technologies, following are five genuinely new capabilities or perspectives that are linked to the development of BCKS:

Commander leader teams (CLT) are peer or hierarchical teams of leaders, some of whom are commanders. Any chain of command is a hierarchical CLT. A staff team is a peer CLT. All soldiers Corporal and above are considered leaders.

Structured Professional Forums (SPF) are groups of soldier leaders drawing on the World Wide Web to share counsel about improved job performance. General Brown describes these individuals as “passionate professionals” seeking to improve their units, their teams, and themselves to win the GWOT. The Army currently supports a subset of these SPFs in an existing Web-based collaboration system known as Companycommand.army.mil and is developing a similar system known as platoonleader.mil.

Knowledge Nets (KN) are networks of readily available and timely data, information, expertise, and applications supporting individual, team, or unit performance. The First Cavalry Division used such a system, called CAVNET, during its recent

assignment in Iraq to facilitate sharing of combat information and most current tactics and techniques among and between soldiers and small unit leaders. The Third Infantry Division, which replaced the First Cavalry in Iraq, is using the same system, now called MARNENET.

Virtual Action Learning Teams (VALT) are quick response temporary teams formed, if necessary globally, to assemble the best expertise available to accomplish specific tasks. An important example of a VALT is the use of telemedicine, whereby expertise from the most competent medical specialists in CONUS is provided to combat medics in Southwest Asia.

Double Knit (DK) is interwoven vertical and horizontal collaboration, as in the warp and woof of a rug. BCKS enables intense horizontal and vertical collaboration among and between CLTs, SPFs, and KNs. A central hypothesis of BCKS is that extensive conduct of double knit collaboration by “passionate professionals” will result in the creation—and sustainment—of high-performing commander leader teams.

C. Proposed Features

In addition to the foregoing five new capabilities or perspectives enabled by BCKS, General Brown suggests the following additions to the current Army Training System to facilitate the preparation of commander leader teams facing the asymmetric threats of future war:

Adaptive Leader Learner (ALL) is a way to prepare leaders and teams of leaders in the art of command by focusing on creating adaptive learning tools. “Adaptive learning develops the leader’s ability to understand, then anticipate, change in a world of increasing complexity—highly complex, ambiguous, simultaneous change”.

Leader Team Exercise (LTX) is an exercise focused on development of teams of leaders. The LTX differs from the Leader Development Exercise (LDX) that is focused on development of leaders as individuals.

Battle Command Review (BCR) is an optional modular addition to current After Action Review policies and programs to develop intuition-based decisionmaking skills.

D. BCKS and High-Performing Commander/Leader Teams

The central insight of BCKS is that it can enable an interactive double knit leader collaboration process that has the potential to generate high-performing CLTs in combat

and other units across DOD and in the JIM environment. BCKS will facilitate significant increases in professional communication that create increased collaboration and thereby create high-performing CLTs. Nothing in BCKS is revolutionary. Rather it takes advantage of proven Army training practices and new opportunities permitted by the increasing availability of data and information generated by using the www and proposed BCKS tools to increase knowledge and understanding in support of current operations whatever the operating environment may be.

Realizing the importance of preparation of CLTs has been a significant insight with respect to leader development and the development of BCKS. Individual leaders (commanders in particular) are clearly very important in a commander-dominant hierarchical organization (any military) but the importance of the individual multiplies - grows exponentially - in the context of continually changing net-centric teams sharing data, information, knowledge and understanding. Effective leader teams (grouped or virtual) with clearly established authorities and responsibilities are central to the conduct of successful global net-centric operations.

The objective of BCKS is to enable high performing individuals, teams and thus units by enabling routine double knit communication of data, information, knowledge and understanding—the process of creation then sustainment of high performing CLTs caused not by sequential, but rather by simultaneous interactions of intense collaboration, the double knit process. That is, interaction within and between SPFs, KNs, VALTs, and CLTs themselves.

There are at least two ways that BCKS contributes to the creation of high performing CLTs. First, BCKS provides for continuous interaction among and between leaders in SPFs, KNs, VALTs, as well as CLTs. Second, BCKS facilitates the use of introspective team learning aids such as individual leader and leader team exercises drawing on Decision-making Exercises (DMXs) (also known as Tactical Decision Games) and learning support processes focused on intuition-based decision-making. An example could be Battle Command Reviews (BCRs) that focus all variations of leader teams on developing knowledge, skills, and abilities to improve individual and team performance. This aspect of use of Army learning system processes such as leader development exercises with AARs and perhaps BCRs drawing on learning support such as DGXs to support team learning is a deliberate extension of current AAR practices. It is an evolution to an additional form of AAR designed to stimulate initial generation of

high-performance CLTs or to accelerate regeneration of high performing CLTs after personnel instability.

BCKS has the potential to become especially important to the development of high performing CLTs in the Joint, Interagency, and Multinational (JIM) environment where most CLTs are formed on an ad hoc basis and have little time to prepare. BCKS has the potential ability to help CLTs open up multiple communications channels to span ethnic, religious, military, business culture gaps. These gaps need to be bridged before high-performing CLTs in the JIM environment can even be contemplated. In these circumstances, to be effective in JIM, double knit collaboration seems highly likely to need both creation and sustainment support that can be provided through the stimuli of repetitive experiential learning/teaching tools.

E. Summary

In sum, BCKS facilitates the development of double knit collaboration through multiple interactions among and between:

- CLTs – those established (vertical-hierarchical and horizontal-peer) and those created ad hoc (modular, expeditionary etc) in response to warfighting needs such as chains of coordination formed in joint task organizations.
- Expanding SPFs of “passionate professionals” eager to “help” each other
- Multiple KNs – created by TRADOC and other proponents to provide data, information and knowledge support to both institution and unit.
- VALTs – leaders (include commanders) grouped to solve problems. Characterized by shifting composition and purpose, leaders and leader teams continually pass data, information and knowledge essential to problem solving, each to the other. VALTs may or may not exist long enough to become a CLT.

High-performing CLTs are not new. They are a shared goal of all commanders of tactical units—be they combat, combat support, or combat service support. There are numerous examples, current and past. LTC Creighton Abrams clearly had created a high-performing battalion at Bastogne in World War II, the 37th Armor. Special Forces units appear to have consistently high-performing CLTs. Prior to the inception of BCKS, units have often transitioned to high performance by pursuing, repetitively, leader and leader team development processes that have been proven through years of experience. Traditionally, transition to high performance occurs when leader teams practice solid teamwork, team decisionmaking, and team leadership in intensive repetitive experiential

learning programs. BCKS will facilitate the development of such teams in greater numbers and with greater speed in the context of a constantly changing environment. Moreover, it will foster the creation of new teams of leaders in new modular organizations grouped to conduct decisive operations. BCKS will increase the likelihood of developing high performance in average units. By stimulating the processes of intensive peer and hierarchical collaboration, or double knit (DK), as described above, BCKS will accelerate the rate at which routine CLTs are transformed into high-performing CLTs.

Also new is the ability for BCKS to provide learning/teaching tools in the collaborative double knit process in order to speed up and increase the probability of timely transition to high performance. Several tools appear to have been drawn broadly from existing Army training practices: the Adaptive Leader Learner (ALL), the Leader Development Exercise (LDX)/Leader Team Exercise (LTX) drawing on current and emerging electronic DGXs and the Battle Command Review (BCR). The five—ALL, LDX/LTX supported by DGXs, and particularly the BCR—owe a conceptual debt to Gary Klein’s seminal work in the Recognition-primed Decision model (RPD) and more recently his work in development of the precepts for conduct of intuition-based decisionmaking.¹

The BCR is another valuable tool in generating high-performing CLTs. The BCR stands out because it capitalizes directly on the highly accepted AAR processes of the Combat Training Center (CTC) model. Drawing on the importance and widespread acceptance of the After Action Review in the CTC paradigm, the Battle Command Review (BCR) offers the potential to be an important stimulant to intensified peer and hierarchical collaboration—double knit—when the expected outcome is high-performing CLTs. The BCR will stimulate continuing review of how the CLT could improve individual leader and leader team performance. It will also help individuals and teams to employ the BCKS-enabled tools better. It will stimulate individuals and teams to reflect on how they might perform better. It will stimulate development of intuitive decisionmaking skills for both individuals and leader teams.

¹ Gary Klein, *Sources of Power: How People Make Decisions*, Cambridge, MA, The MIT Press, 1999. Gary Klein, *Intuition at Work*, New York, Doubleday, 2003. There is no inference that traditional planning processes associated with detailed command are no longer valid. They are clearly necessary but not sufficient.

The single most important learning vehicle for generating high-performing CLTs seems likely to be decisionmaking exercises that are focused directly on the development of team leadership. Current best practices for leader development are the electronic Decisionmaking Exercises used in pre-command preparation at the School of Command Preparation, Ft Leavenworth, KS.

There are two broad categories of DMXs depending on the size, characteristics and requirements of the learning audience. DMXs can be prepared for LDX and LTX use with large groups of relatively inexperienced leaders. An excellent example is the Army's School of Command Preparation, which prepares commanders for the next higher echelon of command. DMXs can also be very useful learning aids for the experienced CLT in combat for synchronizing responses to unexpected opportunities or challenges. The DMXs can rapidly refocus a highly effective CLT or can reestablish team leadership skills after CLT turbulence or turnover.

DMXs are understood by most current Army combat, combat support and combat service support brigade and battalion commanders today because they have been used extensively in the School of Command Preparation (SCP) Battle Command Development Course (BCDC) and the Commander's Reaction Course. Currently, the Army uses DGXs primarily as leader development exercises (LDX) rather than for CLT development. In the future, as BCKS is developed, the Army will likely use DGXs increasingly for CLT development.

II. EXPANDING BCKS TO THE JIM ENVIRONMENT

The concept of BCKS the US Army is developing has the potential to provide essentially all of the attributes of an adaptability-learning environment that we have identified in this study. By facilitating the use of decisionmaking exercises and of battle command reviews, BCKS has the potential to provide for basic adaptability training experiences as well as the development of the cognitive skills of intuition and critical/creative thinking. By facilitating the collaboration of CLTs, SPFs, KNs, and VALTs, BCKS has the potential to aid in the development of both individual and team relational skills.

Training Transformation, including both Joint Knowledge Development and Distribution Capability (JKDDC) and Joint National Training Capability (JNTC), could make use of BCKS concepts. JKDDC appears to have the potential to become a knowledge management system that supports the entire DOD as well as interagency and

multinational clients. JNTC appears to have the potential to expand to a training delivery system that would deliver tactical, operational, and strategic decisionmaking exercises to service, joint, interagency, and multinational CLTs.

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Appendix C
THE ROLE OF RED TEAMING IN TRAINING ADAPTABLE
LEADERS, CLT, AND UNITS

CONTENTS

I.	Background	C-1
II.	Red Teaming in Adaptability Training.....	C-2
III.	Red Teaming/OPFOR Support Activity in JNTC	C-3

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Appendix C

THE ROLE OF RED TEAMING IN TRAINING ADAPTABLE LEADERS, CLTS, AND UNITS

I. BACKGROUND

The Department of Defense has used Red Teaming in many venues including intelligence analysis, weapons systems technical forecasting, operational plans testing, and training. The need for and value of Red Teaming is widely appreciated but not well understood, and it has not been adequately resourced. Consequently, virtually all Red Teaming activities in DOD to date have been ad hoc. They have been developed within a specific Service activity to support the specific objectives at hand.

Nevertheless, many of these Red Teams have been critical to the success of the activity. The best known Red Teams have been in the training venues discussed below, but there have been several others.¹ A recent Defense Science Board Summer Study recommended taking steps to institutionalize Red Teaming within DOD,² and the Homeland Security Institute recently published a paper recommending ways to advance Red Teaming to support the Department of Homeland Security.³

Red Teams in training are traditionally called “opposing forces,” or OPFOR, and are modeled on an existing adversary. The results have been impressive for the Army at combat training centers and for the Air Force and Navy in combat aircrew training. The OPFORs at all of these training venues developed reputations as realistic and formidable opponents. OPFORs have succeeded largely because they have been adequately resourced (an exception to the norm) and led, and they have been allowed to win, as they frequently have done. Another factor in the success of OPFORs has been the acceptance that a unit in training could learn as much, if not more, from losing to the OPFOR as it

¹ Defense Science Board Task Force on “*The Role and status of DOD Red Teaming Activities*,” September 2003, pp 7-12.

² Ibid., pp. 16–18.

³ Shelley Kirkpatrick et al., *Staying One Step Ahead: Advancing Red Teaming Methodologies through Innovation: Final Report*, Homeland Security Institute, February 8, 2005.

would by defeating a more cooperative and predictable enemy. Losing has taught pilots, leaders, Commander/Leader Teams (CLTs), and units that an opponent, even if less well resourced, could defeat an ostensibly superior force through adaptability and cunning. Losing taught the importance of out-thinking an opponent even when the opponent followed a predictable pattern. In essence, this is teaching adaptability but within the constraints of an OPFOR structured to resemble an existing adversary—a threat-based OPFOR.

II. RED TEAMING IN ADAPTABILITY TRAINING

Training adaptable leaders, CLTs, and units requires that they confront situations well beyond their trained comfort zones while under pressure. This means they must be challenged by more than a threat based OPFOR. It requires a full spectrum Red Team that can be both threat and capabilities-based when it is modeling a human opponent. Capabilities-based means that the OPFOR can use any feasible means to win and is not constrained by what the intelligence community thinks it knows.⁴ Moreover, the Red Team might need to include the ability to model nature as an opponent since adaptability can be enhanced by confronting the challenges of natural disasters.

Currently there is no Red Teaming designed specifically to support adaptability training. Any adaptability training that does occur is an accidental by-product of training for other purposes. We know that adaptability can be trained, but actually doing so will require the same conceptual commitment and dedicated resources required for more conventional training. This must include Red Teaming, as has been the case with the current OPFOR mentioned earlier. Good Red Teams should be a central feature of adaptability training. They will provide the stimuli that jolt the training audience away from the familiar and will present the challenges that when overcome in an intense training event become part of an expanded range of experience. This addition to an individual's or group's experiential database is the basis of the intuition needed for adaptability.

If all existing Red Teaming is ad hoc and none is focused on adaptability, what might the solution be? Since Red Teaming is an important component of much training and adaptability training is a subset or component of training, it seems reasonable to nest adaptability Red Teaming within a larger, more formalized training structure. In the

⁴ Capabilities-based Red Teaming easily could have predicted the WTC attacks on September 11, 2001.

adaptability learning initiatives model described in the body of this paper (Figure 3, page 58), modules are envisioned to enhance adaptability of individuals, CLTs, and units at all levels. The Training Transformation program, especially the Joint Knowledge Development and Distribution Capability (JKDDC) and Joint National Training Capability (JNTC), might develop many of these modules. JNTC might use a module to execute a training event or support use of modules throughout DOD by providing assistance including Red Teams.

Red Teaming needs an institutional home and sponsor to improve it as a discipline, provide a venue for integrating the ad hoc Red Teaming throughout DOD, and provide structure and resources to support and improve training through better Red Teaming throughout DOD. JNTC could be that institutional home. JNTC is already responsible for overseeing or supporting many elements of joint training, of which Red Teaming is an important part. It seems logical that JNTC should take on a major Red Teaming support role. If it did, nested within it would be support to adaptability training.

III. RED TEAMING/OPFOR SUPPORT ACTIVITY IN JNTC

The solution to many issues related to effective Red Teaming throughout DOD might be to give the organization charged with overseeing joint training the authority and resources to oversee the Red Teaming associated with and essential to that training. This would entail creating within the JNTC a Red Teaming/OPFOR Support Activity (RT/OSA). Such an organization has the potential to increase the value of joint training as well as Service training—especially in training adaptability-related skills.⁵ Realizing this potential is primarily a function of the resources committed to the task.

The RT/OSA could undertake a long list of useful and important tasks, including the following:

- Becoming Executive Agent to establish DOD Red Teaming structure and matrix support environment
- Incorporating Service Red Teaming best practices into JNTC and promulgating them throughout DOD
- Supporting Experiments, Tests and Evaluation

⁵ For example, see Information Brief on Information Operations Range Program presented by Bradley O Thomason, Program Manager – IO Range, April 14, 2005 to D9; Slides 17–24. Available on request.

- Supporting ACTDs
- Certifying unit or installation Red Teams
- Supporting large Joint Training Events by providing the OPFOR Headquarters
- Providing Red Teaming support to on-line Decisionmaking Exercises (DMX) for CLT and unit training
- Supporting Information Operations Training⁶
- Supporting a CLT training technique of role-playing an adversary. Teach CLTs to look at their own unit realistically through enemy eyes
- Providing tailored support specifically designed for adaptability training

The RT/OSA in JNTC would be a flexible organization configured to meet a wide range of requirements. Thirty to 50 military, civilian, and contractor personnel would probably be needed initially. After maturing, it would become a virtual organization with matrix links to other similar organizations throughout DOD and to a wide range of Red Team subject matter experts. The RT/OSA in support of JNTC would ensure that training modules developed by JKDDC properly incorporated the adversary. In time the RT/OSA might charter a Red Teaming University in following up an Army initiated best practice.⁷

Embedded in the RT/OSA would be dedicated Red Team support to training modules specifically designed to train individuals, CLTs, and units to be adaptable. Some of this support would be onsite active participation in training events. Most would be support in the design of DMX, either self-contained or on-line. For the latter, some sort of execution support might well be appropriate. This could be accomplished through a distributed network of Red Team support personnel and SME who meet the training CLT on line and execute the DMX followed by an on-line After Action Report possibly with videoteleconferencing.

Imagine a library of DMX developed by JKDDC available to support unit or CLT adaptability training. Units could schedule DMX and necessary support through JNTC on a Web site dedicated to the master DMX training schedule. JNTC and RT/OSA would automatically program support within resource constraints. The scheduled training would

⁶ Ibid.

⁷ A TRADOC initiative in 2004 established the Army version of this concept at Ft. Leavenworth.

be executed with full-up high-quality Red Team support, without which high quality adaptability training is impossible.

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Appendix D
JMW EXPERIMENT

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As part of our research into ways to incorporate adaptability learning into the DOD learning environment the IDA team began discussions with a group of concerned individuals from an international management consultancy and executive education firm, JMW Consultants, Inc., about techniques they have used to enhance adaptability in their corporate clients. One of the JMW consultants is a retired Navy Captain who has successfully employed similar adaptability learning techniques during his command tour of an Aegis cruiser. This individual's concern for Navy training and his belief in the value of the JMW techniques has convinced both the IDA researchers and his JMW colleagues that the JMW techniques have the potential to enhance adaptability learning in the DOD. In addition, this individual has provided the essential link between our DOD-related concerns and the capabilities offered by JMW.

We have held a number of meetings involving IDA researchers and JMW consultants during which we have discussed our findings about adaptability and our need to find ways to build adaptability in individuals, Commander/Leader teams (CLTs), and units. We have discussed details about the kind of work that JMW has done with its corporate clients and how those techniques might be applicable in the DOD.

Examples of the kind of work that JMW does with its corporate clients are highlighted on the next page in extracts taken from JMW's online home page.

Following extensive discussions of the JMW techniques, we concluded that it was not feasible for IDA to copy or reproduce these techniques in a report but that it might be possible for JMW to conduct a demonstration or experiment with a small number of units. Such an experiment would allow the DOD to determine if these approaches might be applicable and transferable to the DOD learning environment. In subsequent meetings, we developed a concept for how JMW might demonstrate the ability of its techniques to enhance adaptability learning in individuals, CLTs, and units. In response to our request, JMW submitted a proposal for a demonstration project. That proposal is an annex to this appendix.

JMW Expertise

If you are committed to producing performance breakthroughs in critical areas of your business, JMW will support you in causing the necessary shifts in thinking and behavior of the people essential to your success. Consistently altering what your people see to be possible enables them to generate a higher level of aspiration and create innovative ways to achieve it.

The types of challenges we work on include:

- Achieving unprecedented improvement in company performance
- Implementing critical strategies that require cultural change and breakthroughs
- Dramatically elevating individual productivity and work/life balance
- Making alliances and strategic relationships produce superior results
- Developing a leadership culture of accountability, commitment and effective action

Leaders who are out to produce something unprecedented—for their business, their industry or the world—must enable their organizations to continuously perform in new ways. Doing so requires equipping the organization with the means to generate new ways of thinking, working and behaving consistent with the magnitude of the challenge. It also requires shaking up the status quo by producing a business outcome that defies what is considered possible.

We tailor our approach to the particular needs, strategies and objectives of each client, creating a whole new world of opportunities, insights and answers that weren't previously available.

Organizations must develop their capacity to elevate organizational performance and deliver outstanding business results—not only to compete in today's uncertain marketplace, but also to forward the ultimate strategy of the enterprise. Identifying and delivering on high leverage opportunities in the business, challenging assumptions regarding what's possible and providing a means to increase individual productivity are the cornerstones to success.

JMW's consulting methodologies focus on elevating organizational performance and productivity, helping organizations not only distinguish their key business objectives, but also lay the groundwork to ensure the day-to-day activities throughout the enterprise are tied to producing exceptional results consistent with those primary objectives.

JMW provides a structure that enables the executive and senior level management teams to create a unity of purpose, alignment of commitments and coordinated action. We then help generate new ways of thinking and working throughout the organization to make the new direction operational, increase individual productivity and deliver on the identified breakthrough initiatives with extraordinary results.

JMW Homepage, <http://www.jmw.com/who/index.html>

The essence of the proposal is as follows:

1. JMW will work with one small combat unit, commanded by an O-5, from each of the four services. DOD will select these units.
2. JMW will work with each unit's CLT of 6–10 officers and NCOs to create and make operational a capability for adaptability. The proposed structure of the work with the CLT will include:
 - One 5-day off-site session with the CLTs from each unit
 - Three 2-day on-site sessions with each CLT
 - One-on-one coaching for CLT members during the 9-month engagement
 - Projects for each unit on which they can demonstrate their new abilities
3. JMW will also work with the tier of officers, both commissioned and noncommissioned, reporting to the CLT of each unit. The work with these officers and NCOs will be focused on embedding concepts and skills, realizing the intentions of the CLT, and delivering the outcomes that demonstrate a new level of adaptability. Additionally, JMW will train the officers in skills and tools for adaptability. JMW will perform this work in two 2-day on-site work sessions.
4. During and following the experiment, JMW will work with DOD representatives to describe the techniques they use with the participants and to assist DOD in implementing those aspects of the process that appear to have merit for the DOD learning environment. JMW will be available to conduct additional training projects as DOD may require.
5. An outside observer, such as the Army Research Institute, will conduct an evaluation of the success of the demonstration. The outside observer will establish performance metrics and provide an assessment of the outcome of the project. This outside observer will also identify successful techniques that could be adopted by the DOD learning environment..

The work with the units will take approximately 9 months. The data collection and reporting will take a few months more—in all, about 1 year.

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Annex

JMW PROPOSAL FOR A DEMONSTRATION PROJECT

PURPOSE

The purpose of this proposal is to outline a pilot program in which JMW Consultants Inc. (“JMW”) will support the education and training of US military forces to develop the perspectives and skills required to be able to effectively adapt to the emerging challenges of “asymmetric” threats. This program of support is to be coordinated with other aspects of education and training being proposed by the Institute for Defense Analysis (“IDA”).

BACKGROUND

Over the course of the last fifty years, the nature of warfare the US military has faced has changed significantly. Previously, the wars fought by the US military have been between major powers, referred to as third generation warfare. Currently, and for the foreseeable future, warfare is between a major power and a lesser power, such as a failed state or terrorist organization. This is referred to as asymmetric or fourth generation warfare.

While the nature of warfare has changed dramatically, with few exceptions the nature of education and training in the Department of Defense has not. The Office of the Undersecretary of Defense for Personnel and Readiness asked John Tillson of IDA to support the development of a training and exercise environment that prepares US forces to respond to asymmetric threats.

Mr. Tillson and his project team have identified adaptability, particularly adaptive commands, as the key capability needed to face the uncertainties of fourth generation warfare. The IDA project team has defined adaptability as the process of adjusting practices, processes and systems to projected or actual changes of the environment or the enemy. This includes the rapid creation of innovative TTP and task organizations as well as doctrine and training concepts to meet uncertain demands from the environment, allies and the enemy.

The IDA project team has identified four skills – two cognitive and two relational – which they see as essential to adaptability:

- Intuition
- Critical and creative thinking
- Self awareness
- Social skills

In October 2004, Mr. Tillson began conversations with JMW to determine if JMW would be able to support the development of adaptability capability in the US armed forces. As a result of the conversations, Mr. Tillson asked JMW to propose a program of education and training to support developing adaptability in one operational unit from each of the four service branches.

This program would serve as a pilot to demonstrate the viability of JMW's approach. If successful, further conversations would be had to determine how this approach would be more broadly implemented throughout the Department of Defense.

JMW'S VIEW OF THE CHALLENGE

Based on conversations with Mr. Tillson and members of his project team and reflecting on experience with other clients, JMW offers the following with regard to being successful in shifting how the US armed forces respond to asymmetric threats.

A Shift in Context

Thomas Kuhn, credited with coining the modern usage of the term "paradigm," in his book *The Structure of Scientific Revolutions* defines a paradigm as "a constellation of concepts, values, perceptions and practices, shared by a community which forms a particular vision of reality that is the basis of the way a community organizes itself."

The paradigm or context in which people operate shapes what they see as possible and not possible, useful and not useful, and what they can and cannot do; therefore, it defines their actions and, subsequently, the results that get produced. Without a new context for what the organization is out to achieve, people will continue to operate as they have in the past. There will be incremental improvement as they will do more, better and different versions of what they are already doing. This perpetuates outcomes which may not be appropriate to the current challenges.

Kuhn also said, "Led by a new paradigm, scientists adopt new instruments and look in new places. Even more important, during revolutions scientists see new and different things when looking with familiar instruments in places they have looked before. It is as if the professional community had been suddenly transported to another planet where familiar objects are seen in a different light and are joined by unfamiliar ones as well."

JMW's experience with many organizations confirms that when a new context is created, people see new things as possible and naturally start taking new actions that deliver new outcomes. Additionally, the actions they have been taking will have a new meaning and new power inside a new context.

What is called for in preparing US armed forces for asymmetric warfare is not merely developing new capabilities, but developing the ability to see the already existing context which limits their view of the world. This calls for a new dimension of Self-awareness and critical thinking – the ability to see the limits of one's own thinking. It then becomes possible to invent new contexts consistent with current challenges in ways that foster effective action and the achievement of desired outcomes. This opens up a new realm of intuition and creative thinking beyond the historical constraints.

A New Dimension of Leadership

In addition to traditional leadership qualities – such as vision, earning the respect of people and bold action – facing new and changing landscapes demands a new dimension of leadership. Against such challenges, a leader is called upon to generate new contexts for his/her people to operate inside of. This generation demands that an operational leader not only has a firm grasp of the existing circumstances, but also develops a deep appreciation for the already present context which shapes what his/her people see.

Such an appreciation is the first step in altering what people see to be possible. Leaders are measured by the behaviors and results of the people they lead. In order to accomplish this impact, a leader must develop a facility in the types of conversations that provide people with a

new view of the world and new actions. These social skills are key to a new dimension of leadership which creates an environment that fosters new levels of performance.

Vivid Demonstrations of a New Context

Having an actionable, operational strategy anchors the more abstract notion of context. Setting goals consistent with the new context allows the leadership to bring focus and precision to the most critical aspects of combat operations.

Identifying and delivering measurable, short-term wins consistent with the new context demonstrates a new level of performance is possible. Producing such outcomes helps build the reality of the new context and adds momentums to people's actions.

IV. JMW ENGAGEMENT DESIGN

(PI/LR) The focus of JMW's work will be supporting the Commander / Leader Team ("CLT") of one operational unit from each of the four service branches. The aim is to assist each unit in creating a new context, developing and taking new actions which will allow for a new level of adaptability in the face of new challenges.

(PI/LR) The engagement will include working with one operational combat unit from each of the four service branches – Army, Navy, Air Force and Marine Corps and will take place over a nine month period. The focal point of the work will be with the CLT from each unit. Additionally, work will be conducted with the next level of officers and NCO's from each unit to embed skills and generate a new level of performance.

(PI/LR) It is assumed that a CLT will include 6 to 10 officers and there will be up to 60 officers and NCO's in a given unit.

(PI/LR) The work with each CLT will be designed to create and make operational a capability for adaptability. The proposed structure of the work with the CLT will include:

- One 5-day off-site session with the CLT from each unit
- Three 2-day on site sessions with each CLT
- One-on-one coaching during the nine month engagement
- Projects

Element I: Building a Foundation

(PI/LR) The work with each CLT will begin with a 5-day off-site session. The session will be designed so that each CLT member will leave having:

- Created and being fully engaged in the possibility of developing a capability for adaptability
- Invented pathways to realizing that possibility
- Expanded Self-awareness and critical thinking such that limits of their current thinking and world view are revealed
- Developed ways of operating for creative thinking in generating a new context in which to operate
- Established fundamental perspectives that give them greater access to intuition
- Designed and committed to a project to achieve measurable outcomes which will demonstrate a significantly expanded ability for adaptability. (PI/LR) The session will include delivery of concepts, large and small group discussion, and individual work. The nature of the session will be one of inquiry, education and coaching. The

members of the CLT's will examine their historical ways of operating and the impact these ways of operating have on current performance. Based on these insights they will be challenged to explore and generate new perspectives, new skills and different actions.

Element II: Deepening, Expanding, Practicing

(PI/LR) The three 2-day on-site sessions will be designed to provide further education and training. Each session will include education material which will deepen and expand the work done in the first session. It will also include simulation exercises – opportunities to practice what has been learned in a setting where the officers can be observed and receive feedback on their performance.

Element III: “Making it Real” – Achieving a measurable outcome

(PI/LR) Each CLT member will, during the initial 5-day session, create a project to achieve a measurable outcome by the end of the nine month period. The project will be designed such that the achievement of the outcome will:

- Demonstrate a significantly elevated level of adaptability
- Send a message inside and outside the unit that something new is possible
- Be a stretch beyond what is predictable to happen in the nine month timeframe
- Require new behaviors and actions – it will not be able to be achieved operating in a familiar manner
- Call for engaging people throughout their unit in new ways of thinking and acting

(PI/LR) The members of each CLT will design their projects so that they are coordinated, rather than conflicting, with the projects of their CLT colleagues. Support for the accomplishment of the objectives of the project will be included in the one-on-one coaching as well as in the 3-day sessions.

Element IV: Enhancing Individual Competence

(PI/LR) One-on-one coaching will be provided to the members of each CLT. The coaching will be focused on the development of the individual's capabilities. As each person learns differently, the areas to be targeted in the coaching will be those areas where the individual is having the greatest difficulty.

(PI/LR) Types of issues dealt with will likely include:

- Elevating individual effectiveness and capabilities
- Crafting important communications and designing and conducting highly productive meetings
- Ensuring focus on achieving key project milestones and deliverables.
- Resolution of problems and setbacks

(PI/LR) In addition to and in support of the work with the CLT, JMW will also support the engagement of the next level of officers and NCO's

Embedding Skills in each Unit

(PI/LR) JMW will also work with the tier of officers, both commissioned and noncommissioned, reporting to the CLT of each unit. The work with these officers and NCO's will be focused on embedding concepts and skills, realizing the intentions of the CLT and delivering the outcomes which demonstrate a new level of adaptability. Additionally, the officers

will be developed in skills and tools for adaptability. This work will be accomplished in two 2-day on-site work sessions.

Measurement

In partnership with IDA and any other organization IDA recommends, JMW will design metrics and processes for measuring the effectiveness of the program of support.

ABOUT JMW

JMW is an international management consultancy and executive education firm that supports clients in

- the implementation of critical strategies that requires cultural change and performance breakthroughs and,
- the development of people in leadership, management and innovation

Our offices in the United States, the United Kingdom and Australia serve clients in North America, Europe and Asia Pacific regions.

JMW is committed to helping clients deliver on their most significant strategic goals. We partner with enterprises that are taking new ground for themselves and their industries.

JMW works with clients on challenges such as: corporate strategy execution, company-wide program and systems delivery, culture change efforts, partnering and alliance success, performance turnarounds, schedule/cost reductions, cross-cultural endeavors, and sales and marketing breakthroughs.

JMW has developed a structured approach, which assists our clients in achieving specific measurable outcomes, which often exceed the current definition of what is possible. JMW trains people in a way of thinking and working that challenges current perspectives, mindset and assumptions resulting in new actions and behaviors. This training allows the client to articulate significant aspirations for the future, and then enables the organization to deliver extraordinary results as the pathway to that aspiration.

JMW provides communication and leadership tools that are not only applied to the short-term objectives, but that help managers develop skills useful in facing their ongoing challenges. JMW tailors its programs to the particular needs, strategies and objectives of each client.

JMW's education programs are designed as a structured learning experience to give participants new perspectives and new ways to think about the challenges they face. With this new focus, as well as new methods and tools, participants are able to leverage their knowledge and skills in all their accountabilities, and to apply new insights, practices and models to a wide range of challenges and issues. Moreover, they gain access to a new learning model that supports them in expanding their ongoing development through a variety of resources and learning channels. In that way, they become a potent resource for their organization and provide a competitive advantage in fulfilling key business goals.

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Appendix E
GLOSSARY

Appendix E

GLOSSARY

3GW	Third-Generation War
4GW	Fourth Generation War
AAR	After Action Review
AEF	Air Expeditionary Force
AFDD	Air Force Doctrine Document
AKO	Army Knowledge Online
ALL	Adaptive Leader Learner
ARI	Army Research Institute for the Behavioral and Social Sciences
ATLDP	Army Training and Leader Development Panel
BCKS	Battle Command Knowledge System
BCR	Battle Command Review
BCTP	Battle Command Training Program
C4ISR	Command, Control, Communications, and Computers and Intelligence, Surveillance, and reconnaissance
CCIR	Commander's Critical Information Requirements
CGSC	Army Command and General Staff College
CLT	Commander/Leader Team
CNO	Chief Naval Officer
CO	Commanding Officer
COCOM	Combatant Command
COE	Contemporary Operating Environment
CONOPS	Concept of Operations
CONUS	Continental United States
CPX	Command Post Exercise
CTC	Combat Training Center
DARPA	Defense Advanced Research Projects Agency
DK	Double Knit (interwoven, or vertical and horizontal) Collaboration

DMX	Decisionmaking Exercise (also called Tactical Decision Games)
DOD	Department of Defense
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities
ECS	Expeditionary Combat Support
EOS	Expeditionary Operations School
GWOT	Global War on Terrorism
IDA	Institute for Defense Analyses
IPB	Intelligence Preparation of the Battlefield
JIM	Joint, Interagency, and Multinational
JKDDC	Joint Knowledge Development and Distribution Capability
JNTC	Joint National Training Capability
KN	Knowledge Net
LDX	Leader Development Exercise
LTX	Leader Team Exercise
MDMP	Military Decisionmaking Process
MIDLIFE	Military + Information + Diplomatic + Legal + Intelligence + Finance + Economic
MOUT	Military Operations in Urban Terrain
NCO	Noncommissioned Officer
NGO	Nongovernmental Organization
NSC	National Security Council
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
OPFOR	Opposing Forces
OSD	Office of the Secretary of Defense
OUSD (P&R)	Office of the Under Secretary of Defense for Personnel and Readiness
ROTC	Reserve Officers' Training Corps
RPD	Recognition-Primed Decision (Model)
RT/OSA	Red Teaming/OPFOR Support Activity
SCP	School of Command Preparation
S.E.N.S.E.	Synthetic Environments for National Security Estimates
SPF	Structured Professional Forum

T2	Training Transformation
TCS	Tasks, Conditions, and Standards
TDG	Tactical Decision Game
TRADOC	Training and Doctrine Command (US Army)
TTP	Tactics, Techniques, and Procedures
VALT	Virtual Action Learning Team
WWI	World War I

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